DOCUMENT RESUME

ED 144 528 IR 004 782

AUTHOR	Foskett, D. J.
TITLE	Preliminary Survey of Education and Training Programmes at University Level in Information and Library Science.
INSTITUTION	United Nations Educational, Scientific, and Cultural Organization, Paris (France).
REPORT NO	COM.75/WS/34
PUB DATE	76
NOTE	167p.
AVAILABLE FROM	Office of Document Distribution, UNESCO, 7 Place de Fontenoy, 75700 Paris, France
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	Curriculum; *Educational Programs; *Foreign Countries; *Higher Education; Information Science; *Library Education; *Library Schools; Library Science; *Surveys; Teaching Methods; Training; Universities
IDENTIFIERS	*National Information Systems

ABSTRACT

Seventy schools of library and information science in 13 countries responded to a 1972 questionnaire on educational and training programs. The survey was conducted to review the current position and trends in training and education for library and information science. Respondents were questioned on the need for change, mechanization, theory and practice, courses and curricula, and teaching methods. Based on the survey, literature, and personal contact, the study concluded that: (1) the theoretical content of courses varies considerably; (2) research programs are academic and should be tested against real life situations; (3) too little attention is paid to the social or vocational role in initial courses and at the research level; (4) international and comparative studies rarely exist; (5) more attention should be given to overall structure of courses; (6) most teaching staffs are professionals and need a teaching course; and (7) the better use of audiovisual aids needs investigation. The report includes descriptive summaries of the 13 countries--Czechoslovakia, Federal Republic of Germany, France, Hungary, Netherlands, Poland, Scandinavia, Iceland, United Kingdom and British Commonwealth, United States and Canada, Latin America, Japan, and the USSR--and a detailed analysis of replies to questions. (KP)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED144528

Distribution: limited

COM.75/WS/34
Paris, 6 February 1976
Original: English

U S DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

NATIS

PRELIMINARY SURVEY OF EDUCATION AND TRAINING PROGRAMMES AT UNIVERSITY LEVEL IN INFORMATION AND LIBRARY SCIENCE

by D.J. FOSKETT
University of London Institute of Education

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY
Edward Wegman
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

(c) 1976 UNESCO

Reproduced by permission of UNESCO

Paris, Unesco 1976

IR004782

© Unesco

FOREWARD

A main objective of NATIS is the provision of "adequate numbers of professional staff to meet the demand for qualified personnel to operate the national information system (NATIS)" (1). It is also urged that educational activities for this purpose should be carried out in universities or equivalent institutions of higher learning.

The present study, based on information received in answer to a questionnaire sent out in 1972 by the Secretariat of the FID Education and Training Committee (FID/ET) and the Centre for Scientific and Technical and Economic Information (CIINTE) in Warsaw, is a preliminary attempt to survey education and training programmes at university level in information and library science in thirteen countries. Emphasis is mainly on identifying major changes than on recording continuous development in the field.

The survey points up the need for improving the curricula to keep pace with the technological changes in the profession, so that it can meet the evolving needs of the community for information.

This survey will be useful to all those who are involved in the education and training of librarians and information specialists and it is hoped that it will serve for future planning and development in this field.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Unesco Secretariat concerning the legal status of any country or territory, or of its authorities, or concerning the delimitations of the frontiers of any country or territory.

---

(1). National information systems (NATIS) : objectives for national and international action (COM.74/NATIS/3.rev.), Paris, Unesco, 1975.

CONTENTS

1. Introduction and commentary

1.1 Introduction
1.2 Scope of the survey
1.3 The need for change
1.4 Mechanisation
1.5 Theory and practice
1.6 Courses and curricula
1.7 Teaching methods
1.8 Conclusions

2. National surveys

2.1 Czechoslovakia
2.2 Federal Republic of Germany
2.3 France
2.4 Hungary
2.5 Netherlands
2.6 Poland
2.7 Scandinavia
2.8 Iceland
2.9 U.K. and British Commonwealth
2.10 U.S.A. and Canada
2.11 Latin America
2.12 Japan
2.13 U.S.S.R.

3. Analysis and replies to questionnaire

PART 1 Introduction and Commentary

1.1 Introduction

In 1967, the FID sponsored a major International Conference on Education for Scientific Information Work, organised in London by Aslib, the Institute of Information Scientists and the Office for Scientific and Technical Information (OSTI now the British Library Research and Development Division). This was subsequently published as FID 422, 1967. The Conference was divided into five areas: Future needs of education in information science, Educational background for entry to courses and their ultimate aim, Syllabus and structure of courses (theoretical and practical), Collaboration (on the local and international levels), Provision of teachers and research workers. These proceedings contain a great deal of information, documentation, argumentation and speculation, and they have prepared the way for a more detailed study of the actual programmes in operation, to see their similarities and differences, and to discover, if possible, whether any evidience of trends was visible, particularly in relation to the neighbouring areas of Librarianship on the one hand, and Computer Science on the other. In 1971, the FID/ET Committee decided to pursue the investigation, and circulated a questionnaire to some seventy Schools of Library and Information Science all over the world.

The present Survey is the first result. Its main purpose is to present a review of the current position and of some trends in training and education for Information and Library Science at the level of the university or equivalent institution of higher learning. In view of the very great variety of courses in virtually every aspect (length, content, responsible institution, etc.), no attempt has been made to formulate precise definitions; this and similar problems have already been dealt with, as far as they can be at present, by Herbert Schur in his OECD Report, Education and training of information specialists for the 1970's, published by the Postgraduate School of Librarianship and Information Science, Sheffield, in January 1972. From a traditional librarianship point of view, the current situation, with particular reference to developing countries, has been well reviewed by John Dean, in his book Planning library education programmes (London, Deutsch, 1972), where every aspect is discussed: objectives, administration, physical plant, personnel, curriculum teaching methods, and research. A similar review with more emphasis on "documentation" is contained in the report, La formation des documentalistes dans les pays en voie de développement, published in Les Cahiers de l'A.B.H., 1971. This conference was held at the Institut Ali Bach Hamba in Tunis, which has for some years been conducting high level courses for francophone countries in Africa, with considerable help from FID.

The debt of this Survey to these publications is obvious, and is gratefully acknowledged; some duplication is inevitable, but has been kept to a minimum, and it is hoped that they may be regarded as complementary. The net here has been cast widely to include courses of a more traditional character in Library Science as well as those more revolutionary in character; for a highly detailed analysis of courses in Information Science with particular reference to automation and the role of computers, the reader is referred to Schur. All these three documents are arranged mainly by reference to problems; in order to present a somewhat different approach here, an arrangement by country and institution has been chosen, rather than by the subject content of the courses, although a general discussion of the results and some tentative conclusions are also offered.

As a rough working guide, with no pretence at offering a standard, the following interpretations are used:
"Training" has been understood as the initial professional courses in Information and Library Science followed by students who have already completed academic studies up to and including university level, in universities or other institutions.

"Education" has been understood as studies at the university level, of a more academic or theoretical nature, usually resulting in the award of higher specialised degrees such as M.Sc., M.A., Ph.D. etc.

These are far from being, in practice, mutually exclusive, since institutions in several countries offer courses which combine academic with professional studies at the initial level, in courses of more than normal duration and leading to the award of a Master's degree. Examples are the City University and University College, in London, and the Postgraduate School of Librarianship and Information Science in Sheffield University. The relation of theory and practice is discussed in more detail later, on p.6 ff.

Similarly, it has not proved possible, nor deemed desirable, to separate Library Science from Information Science. While one can readily distinguish, for example, between Historical Bibliography and Rare Book Librarianship on the one hand, and Computer Science on the other, it is clear from the actual programmes submitted in answer to the questionnaire, that the majority include a whole range of subjects common to both areas. We are justified in concluding, on the basis of this evidence, that we have to deal with a variety of subjects, certainly, but that together they represent a continuous spectrum rather than two sets of completely separate studies. The"art of the book" and curatorship represent one end of the spectrum, while automatic indexing and retrieval systems represent the other. Those courses that contain nothing that could be reasonably associated with librarianship are, in actual fact, more like what one would expect to find in a programme for training computer scientists, rather than information specialists. Usually, however, computer courses are included as part of a wider-ranging syllabus which also includes what we should normally associate with the operation of a library information service, albeit specialised.

If we find such a spectrum which draws on new disciplines and techniques, it does not mean that we have to take them over completely and make them wholly our own - or vice versa. On the contrary: it has become evident during the last twenty years that the traditional art of librarianship has widened its vision and become aware of its responsibility for acting in a positive way towards its material, documents of all kinds and the information they contain. Librarians have much to learn from these new technical advances, but this does not involve changing into some other type of professional. We are all engaged in a social activity, namely, facilitating the transfer of knowledge from one human mind to another. It may, perhaps, be remarked in passing that influence might well pass in the opposite direction also: many computer and other technical specialists are woefully ignorant both of the real problems of information handling, and of their own literature.

It is beyond argument that professional activities have changed and developed greatly in recent decades, and one of the major problems of a teaching institution preparing professional workers is always that of keeping up with practice. It has been particularly difficult in this profession, because of the lack in most countries of proper facilities for conducting research in Schools of Library and Information Science. The result is that many new development appear in practical situations, and this, while being apparently sensible, has two disadvantages. One is that experimental work is on the macro-scale: new ideas are put into practice without adequate testing, and, as we know from bitter experience with computers, disaster can easily follow. The other, of more concern here, is that students leaving the Schools, having passed their qualifying examinations, are often ignorant of actual practice and incapable of participating in it without considerable re-training.

A primary need, therefore, is for greater facilities for research in Schools, and this should never be underestimated, particularly in a university context where it is essential that the subject content should be seen to be of an academic standing equal to other departments. Moreover, some research should undoubtedly be academic, advancing the frontiers of knowledge even though its practical relevance may at times seem obscure. Only in this way can a professional study, like any other academic discipline, remain alert to the possibilities of the future, even though inevitably the explorations may on occasion lead into blind alleys. An outline programme for teaching research method is given in Appendix IV of John Dean's book Planning library education programmes.

At least one foot must always be kept on the ground, of course, and this can easily be done through close contact with practising librarians and information workers. Indeed, most Schools make some use of the services of part-time teachers who are also practitioners, and this is highly desirable. Both parties can benefit: the full-time staff can ensure that the distance between their teaching and real life does not increase; the part-time staff can seek the advice of teachers who have more time for study and reflection on problems, and may well be more up-to-date in their knowledge of the literature.

1.2 Scope of the Survey

The Survey is derived from returns made to a questionnaire drawn up and sent out in 1972 by the Secretariat of the FID/ET Committee, CIINTE, Warsaw, to some eighty universities and other institutions providing courses of university level. While it is difficult, using the questionnaire method, to be quite sure that all the respondents are talking about the same things, nevertheless it is felt that there has been sufficient publication and public discussion to assume a reasonable degree of correlation between the data given in response to most, if not all, of the questions. The continuous interest of the FID, and also of IFLA, has ensured that most of those who are interested in professional education have had the opportunity to participate in international meetings and discussions. The Education Committee of IFLA, under the chairmanship of Professors J. Periam Danton and Lef Vladimirov, has for many years encouraged the collection and standardisation of data concerning educational programmes; in the FID, the ET committee has been equally active in the more specialised fields of documentation, culminating in the Seminar on "Information science as an emergent discipline" held at Vezprem, Hungary, after the IFLA and FID Conferences in Budapest in 1972 and whose proceedings were published in 1974. The papers and discussion at this Seminar revealed a hopeful unity of outlook amidst a diversity of programmes and approaches; representatives of traditional librarianship and advocates of the utmost mechanisation of information systems found sufficient community of interest to justify a mood of cautious optimism for the future.

1.3 The need for change

A trend report is almost by definition a review of departures from the traditional rather than an emphasis on what is continuous, and this review tries to identify, in general if not precisely, what seem to be the major changes of direction revealed by the Survey. But it does not overlook the fact that equal significance can, and perhaps should, be attached to those features which represent a continuation and development of what has been characteristic of education for librarianship in the past.

For example, nearly all respondents lay some stress on two areas that have always occupied attention, even if by different names: first, classification and cataloguing, which lie at the foundation of all forms of information retrieval systems (whether acknowledged or not); and second, subject bibliography, which in its modern form is sometimes represented by an emphasis on subject knowledge, even though this does not figure largely as an element in School programmes. This is,

indeed, sometimes depicted as an area of change; but libraries have always tried to recruit scholars with specialist subject knowledge, and this is confirmed by the vast majority of programmes at the post-graduate diploma or Master's level for the initial course. Failure to acknowledge the fundamental importance of these two areas can only lead to either an imbalance in over-stressing the merely technical, or a lack of substantial professional ballast to provide a firm basis for practice in a library or information service.

What users of these services are looking for is not subject expertise, which they probably have themselves; we should not seek to produce master-minds who pretend to be more expert than the experts. Nor are they looking for computer engineers whose role is to help them with their problems as users of computers. In the first case, they will prefer to consult their own specialist colleagues; in the second they will go to experts in the computer sciences. To pretend that Schools of Library and Information Science produce either of these two classes of expert, by virtue of their own courses, is to mistake the shadow for the substance. We base the value of our profession to society on the thesis that a university course in any particular subject does not automatically produce a specialist librarian or information specialist, because there are other characteristic skills that have to be acquired in addition to, and qualitatively different from, the subject knowledge per se. By the same token, a course based on imparting those same skills does not automatically qualify its students as subject experts.

But this is not to go to the other extreme and deny the value of specialist knowledge beyond the professional skills; rather, it emphasises that one area in which change will be fruitful is the refinement of the relation between subject specialist and information specialist. After many experiments in the form of short courses, advanced seminars, inter-disciplinary conferences, two factors seem to be emerging.

a) "Communication"

The first is that more attention is now paid to the process which is usually loosely called "Communication". This is a vague term but it seems that none better is yet available. The term "social epistemology" coined by Margaret Egan and Jesse Shera many years ago has the right connotation as explained by them, but has not won general acceptance - which suggests that it is not entirely satisfactory. The danger of confusion with other areas involved with communication is very present: electrical and telephone engineering, radio and television, journalism, are all fields engaged in communication. At least one department of library and information studies was for many years located in a university faculty of journalism, and some discussions have recently been initiated by the LA in the UK with various groups who claim to be communicators in one way or another. Many of the newer programmes, particularly at the initial or first degree level, include courses which deal with problems of communication in a wider scope than that of documentation. The Survey indicates, however, that the emphasis in our curricula still tends to be on the role of records, of all kinds, in the transfer of knowledge. We find courses, for example, on "Methods of intellectual work", "Publishing media for scientific information", "Scientific creativity and research results", "The flow of information in research, industry and government", and so on. In other words, we have to do with the social role of the librarian and information specialist in facilitating the collection and dissemination of information in response to the needs of particular groups of users. It does not affect the nature of the role whether these users are a local community served by a public library, a university of teachers and students, or the scientific research staff of a technical industry. The methods and materials will obviously vary, but the nature of the social role does not undergo a qualitative change. Recognition of this is illustrated by the many programmes in which technical processes of information handling are offered as options in courses for public and university librarianship.

In this area, therefore, what has emerged is the encouraging symptom that such specialisms as arise from a dynamic "systems" vies of Communication are being considered in relation to other specialisms in the field of documentation, not as something from a totally different compartment of knowledge. This emerges most clearly in courses designed to teach the "systems" approach, and this should surely be regarded as one of the most fruitful areas for change and development, ranging as it does from the philosophy of science to the management of all types of institution. This is particularly heartening since some past differences of opinion on the nature of information science as distant from librarianship have centred on this very factor - that information specialists are not particularly concerned with management, being usually part of a larger organisation with its own professional management staff. The fruitfulness of the systems approach lies precisely in the fact that it views every group as having its own existence as an entity exhibiting its own characteristics, as well as being related, in diverse ways, to many other groups, each also having its own characteristic features.

On this view, no new technical or theoretical advance, however powerful, will be considered as an end in itself, but as part of, and contributing to, the already existing corpus of accepted professional knowledge. It will modify, refine and enhance that corpus, but will not replace it; equally, it should not be regarded as an unwelcome excrescence to be isolated and quarantined from the rest of the corpus, for in such a case there will be no inter-action and no improvement in either direction.

b) Subject literature

The second emergent factor provides an illustration of integrated development. It concerns the greatly increased proportion, in all types of course, of time devoted to the study of specialist literature. Many Schools, particularly where librarianship is the dominant element, still devote much attention to the study of the national literary heritage, and this certainly correct as preparation for work in a National Library or in a university Faculty of Arts or Letters. Many librarians wish to train for such posts, and it is important for them to know the bibliographical structure of their national literature; it will, indeed, be part of their duty to bring to the more literary fields the same dynamism of information service as we find in the service of science and technology. Conversely, the same depth of study hitherto devoted to such literary fields should be extended to other parts of the field of knowledge. This is what can be seen from many programmes. Any librarian or information officer, as a professional concerned with books, periodicals, documentation of all kinds, should be on terms of a certain familiarity with great literature, as a person of culture, deserving of respect and of status in the community, but he does not have to master its bibliographic apparatus if the group he serves comprises physicists, chemists, engineers. It is the bibliography relevant to the users' needs which he must master; it is in this that he will be expected, by his colleagues, to be their expert.

This area has been well cultivated by now, and already provides another bridge between our profession and our colleagues in others; sociological studies in science cannot avoid considering the role of publication and records, and a conference such as the Ciba Foundation's Communication in science: documentation and automation (London, Churchill, 1967) well illustrates the benefits derived from the meeting of documentalists and subject specialists for this kind of discussion.

1.4 Mechanisation

It was probably to be expected that the most outstanding changes would be in the area of mechanisation and automation. So much has been written on this that, if courses were established only on the basis of published literature, this would doubtless outweigh all the other subjects in the curriculum. It is still extremely

difficult to form an exact idea of the range and the actual importance of computer studies. Some Schools in countries like the U.S.A., Canada and Japan, where there is a large and powerful computer industry, have produced syllabuses which give a depth of training not unworthy of a computer specialist. The examples quoted of computer-science oriented curricula illustrate this, and one is bound to question, what role is envisaged for the students who complete these courses? Are they to be considered as qualified in the same way as the graduates of a more traditional information science course? Will they, for example,be equipped to manage a full-scale Information Department or a University Library? Will they be expert in subject bibliography? Or will they be so specialised that the natural course of their personal career will be towards a computer science department? If so, would they not be better served by a full-scale specialist course, with an option relating to information science, rather than the other way about?

This problem is not yet resolved, namely the range and depth to be pursued in a field which, in the actual operational situation, is ancillary, and not central. Even where an operation is involved principally with computerised storage, retrieval and publication, as with abstracting and indexing services, the purpose of the operation lies in the product, not the machinery for producing it. If some completely new type of machine, vastly superior, were invented, presumably that would be used, and the syllabus changed to deal with that. But the product and its use would not change, and that is the central focus which should determine the content of an education syllabus. We have for centuries regarded the book and periodicas as the most important vehicles for the transmission of knowledge, and courses in librarianship have included the study of printing; but librarians have never, qua librarians, claimed to be printers, even though some have indeed put their knowledge to practical use in private presses.

What is now required, perhaps, is a fresh and impartial study of this area, to try to form a well-based estimate of the real practical value of such courses to the students; in particular, one would like to have more information on the real contents of the courses, and on the subsequent careers of the graduates and their contribution to the development of computer applications in operational situations.

There is a clear need for change and development in curricula; but the changes should, in a professional education programme, be related to the needs of the community. This factor is what balances the swing of the pendulum between over-conservative adherence to what has been tried and proved in the past but may have outlived its usefulness, and over-zealous embracing of anything that is new simply because it is novel. As always, both the need for theory and the test of theory lie in practice.

1.5 Theory and Practice

One of the hallmarks of a profession is that its practice is based on a tested body of theoretical foundations, and the relationship between theory and practice thus becomes of key importance in professional education. It can be considered under three main headings

a) Pre-entry practical experience
b) In-course practical experience
c) Post-course in-service training.

a) Pre-entry experience. This usually amounts to a decision by Schools on whether or not they will accept students direct from secondary or university education, though it obviously relates also to the questions of full-time or part-time study, and of the use of correspondence courses, which will be considered under heading (b).

Many respondents have indicated a level of entry related to academic qualifications only, which can probably be taken to mean direct entry from academic education without an intermission for practical training in an operational service. This has many advantages, the main one being perhaps that the students are in the habit of study, have (in some cases only) received advice on their choice of career, and have made a conscious decision to proceed to professional study. They are naturally anxious not to wast time, but to qualify themselves for professional work as quickly as possible. On the other hand, a period of practical work, unless closely related to a School course, may be mere sub-professional routine and may accustom the student to life as a worker, earning wages and free from the atmosphere of a "School". He may be reluctant to resume the status of a pupil.

The advantages of pre-entry practical work, however, are not to be gainsaid. Pre-eminently, it gives the student the opportunity to discover whether he is really suited to his choice of profession; he can change his mind without undergoing a painful disillusionment during his actual course. The best educational argument is that pre-entry practice familiarises the student with the reality of professional work, its jargon and terminology, and thus makes it easier for him to get into full stride once embarked on his course. For many practical operations, a short period of doing is better than many hours of description.

Some respondents would go as far as to require two or even three year of preliminary work, but most would probably accept one year. The important factor, which is not always easy to organise, is that any such preliminary work should be part of a proper training programme. It may not always be easy for a busy service to make the most suitable arrangements for giving trainees the sort of practical work that will be most valuable for them as preliminary to their professional studies, and this is an area on which further joint discussion might well take place. One would like to think that the necessary resources might be found for making this type of preliminary experience an integral part of the course itself, so that the trainees could be regarded as supernumerary to the staff of the employing organisation. This is occasionally done, by the Polytechnic of North London for example, which adds a term to the normal 3-term post-graduate course, or 6-term non-graduate course; most of the extra term - the student's first - is taken up by practical experience at a co-operating library, but under the supervision of a member of the Polytechnic staff. The libraries concerned are not responsible for paying the student, but are requested to submit their proposals to the Polytechnic for organising the students' work to give them the best possible range of experience.

b) In-course experience. Whether or not their students have had previous experience of practical work, most Schools make some arrangements for this during initial courses at least. It may amount to some months, as with the Polytechnic of North London system mentioned above; it may be a much shorter period of 2/3 weeks, or it may be confined simply to one-day visits. The longer periods are more difficult to organise, particularly where the students cannot obtain additional financial support, but they do allow for a more deliberate programme of study, giving the student a chance to do the work as well as simply watching it being done by a regular member of staff. For the shorter periods, the best that can be said is that they are probably better than nothing; their justification is that they take away as little as possible from the theoretical course. One-day visits probably do not justify themselves at all, except for specialist operations such as printing, bookbinding, and computer operation, which most students are unlikely to have to do themselves, but of which a good idea can be conveyed by demonstration. It is not a very rewarding pastime to try to watch a library operating.

One particularly valuable system, but rare, and not specifically mentioned by any respondent, is that of sending students to another country for their in-course experience. This may be difficult to organise and may of course involve the student in additional travel and lodging expense, but it does add a completely new facet to the normal range of practice. Several "stagiaires" from the Paris Centre

National des Techniques de la Documentation have in recent years completed their "stages" at the University of London Institute of Education Library.

Courses based on part-time or home-based study such as correspondence courses are widely used, particularly in areas where there is a great shortage of practitioners. Schur's view is that "part-time education is suitable only for relatively short courses and for operation oriented programmes where the practical experience gained in the day-to-day work in an ISR system complements and supplements the formal studies", and it is the general view that full-time study is educationally superior, for initial courses at least. For advanced studies leading to higher degrees, part-time study may be more useful since the student may very well wish to relate his thesis to practical work, and, in addition, the financial resources necessary for full-time research are still far from being generally available.

The "Summer Session", popular in the U.S.A., offers a very practical compromise, being full-time but over a short period. Students are able to take one or two courses per Session and complete their degrees over a period of years, assembling the appropriate "credits" for the successful completion of each course. Anyone who has taught these courses can appreciate the value of the maturity and experience of the students, who, for their part, can enjoy the benefits of full-time attendance, association with other students, and so on, without sacrificing their own jobs and salaries.

c) Post-course in-service training. Nearly all respondents were very much in favour of further training, both immediately on graduation from an initial course, and subsequently as "refresher courses". The U.K. Library Association has a compulsory requirement of one year's practical work, under supervision, to be completed after success in the initial professional examinations; this has to be certificated by the supervisor, who specifies on the certificate those areas in which the student has performed satisfactorily. As with pre-course experience, immediate post-graduation practical work should be based on a proper programme whenever possible.

Most comments naturally tended to stress the need for refresher courses in the light of a rapidly advancing professional technology. This applies equally, if not more, to those now in senior posts who completed their initial training before the full effect of computers was felt, and who may well need basic instruction in their use, even more than new graduates who have usually included some computer technology in their studies. Here the need may be best met by short courses. It is obviously difficult for senior staff to be away from their posts for long periods, but in any case we are not concerned here with a range of courses; refresher courses usually (and should) take the form of a single-subject course dealt with in some depth by specialists. Employers can usually be persuaded to subsidise this kind of concentrated study, when they might be reluctant to do so for a more general "updating" type of course. Specialist seminars, conferences or "institutes" are well-known, and are organised by most Schools, and should certainly form part of any programme for the future. The FID Seminar in Hungary on "Information Science as an emergent discipline" is a good example of an international effort, made possible by combining it with the main conferences for which most participants were subsidised by their own governments or employers. This technique can be commended for future use.

One clear advantage of such a gathering is that it facilitates exchange of experience at the international level, which was highly favoured by respondents. In this respect, Unesco's large programme of fellowships is well know and mention should be made of the work of the Ford Foundation, the OAS and the British Council, which has for many years arranged for individuals and groups to pay visits and attend courses abroad; this applies both to British citizens who go overseas, and to others

who visit the U.K. The normal procedure is to organise a programme of visits, but specialised courses are also arranged, particularly with the Schools at Sheffield and Aberystwyth. The USSR provides extensive and varied facilities for foreign students to attend courses in Moscow. In India, thanks to the Sarada Ranganathan Endowment, a succession of eminent foreign librarians have conducted courses at the Documentation Training and Research Institute (DRTC), Bangalore, where S.R. Ranganathan himself set up a very successful School under the auspices of the Indian Statistical Institute.

1.6 Courses and curricula

There is a clear distinction between initial courses which lead to a first or "Bachelor" degree level of qualification (or a recognised equivalent), and to a post-graduate level, a Diploma or Master's degree. All the first degree level are of at least three, and usually four, years' duration, and most include a period of in-course practice. The Diploma courses are normally of one academic year, the Master's of one calendar year or two academic years. Some, but not all, universities allow part-time study over a longer period.

Where the course leads to a first degree, it nearly always contains a "general studies" element in addition to the library and information science element. Sometimes this consists of a course in the national literature, allied to the history of the book arts. Some courses include lectures on philosophy, sociology, psychology, logic, linguistics, history and philosophy of science; it is difficult to judge how far these are, or can be, oriented towards library and information science, so that the programme forms one integrated whole. There is a very real danger that such courses may be no more than extras, to make up the necessary length of study time, or to give an "academic" veneer to what is basically a vocational course.

The same is undoubtedly true of some computer science teaching, although there is also evidence of purposeful integration, mainly arising from the considerable overlap in the interpretation of what constitutes "information". Perhaps the clearest sign of this is that the term "Informatics", widely used in the U.S.S.R. and countries of Eastern Europe to mean the broad field covering library and information science and their ancillaries, is equally widely used in Western Europe to mean communication science based on computers. Some confusion was plainly evident at the Rome Conference of 1971 on this score; and the proceedings of the International Federation for Information Processing (IFIP) sometimes exhibit the same dual personality. Some practical evidence of this dualism is shown in the programmes listed in the two categories, "Theoretically-oriented" and "Computer science oriented" curricula. The vast range of the Georgia Institute of Technology School of Information and Computer Science matches the equally vast range of the University of Warsaw Post-graduate Study in Informatics, but the two programmes clearly have a different orientation. The first contains more that related to computer engineering, and very little on library/information service management; the second treats the computer from the scientific/theoretical rather than the engineering aspect, and has more of management and even of traditional librarianship topics such as reference materials, classification and cataloguing. The latter reflects the influence of the course on Informatics prepared for Unesco by Professors A.I. Mikhailov and R.S. Gilyarevsky.

It is of interest to compare the Warsaw programme with two others that have developed out of a context in which libraries are strong, well-established and closely related to information services: the City University in London, and the DRTC in Bangalore. Both stress the theoretical foundations, in particular the nature and structure of knowledge and means for its communication - philosophical, psychological and sociological foundations. Unlike the Warsaw course, in which classification occupies a relatively small proportion and receives somewhat traditional treatment, the other two show clearly the influence of the profound studies in classification theory of their founders, J.E. Farradane and S.R. Ranganathan.

The "Universe of Subjects" course at Bangalore was unique for many years, and has only recently been matched by the "Universe of Knowledge" courses at the University of Maryland and Polytechnic of North London, under D.W. Langridge.

The actual amount of time spent on new technology is not large, except in those programmes which are specifically computer-oriented or given in Computer Science Departments. The latter are nearly all located in Canada, Japan and the U.S.A., as could be expected from a study of the specialist literature though elsewhere, as in Scandinavia, courses in computer science dpertments are available to library and information students. The relationship between these two areas, each claiming the title "Information Science" or something similar, will probably tend to remain rather vague until there is a wide-ranging,international body of expertise, based on real life experience of successful computer operations in library and information services. At the moment, there are grounds for regarding these particular courses as having had a divisive effect on the whole profession; but there can be little doubt that the development of a successful and appropriate computer technology for library and information services will have the opposite effect, and will show up the similarities, rather than the differences, among the problems to be solved in the various types of services.

It may be, however, that the divergences between curricula owe something to the level of study. The U.S.A. was one of the first countries in the world to provide university schools of library science, and for many years the normal initial qualification was a Bachelor's degree. After much discussion, this has now been dropped, and all courses in library and information science, including initial courses, are at the post-graduate level. This means that all the students have completed a Bachelor's degree in a subject field, thus providing a firm foundation on which professional studies can be based. It is easy to see that mathematics and science graduates are more likely to choose, and succeed in, courses which have a substantial element related to their first degrees. Indeed, it is hard to imagine that a graduate in a literary subject, with no advanced mathematics, would be able to cope with the computer-oriented programmes.

Of course, it is not only in those programmes that graduates are at an advantage; any degree will give the student a good start in subject bibliography, information needs of users, and even, perhaps, an insight into some of the problems of university libraries. Where controversy may arise, however, is in whether a "Master's" degree is an appropriate award for completion of an initial course in professional education. The usual practice in North America is to distinguish the professional degree as Master of Library Science (MLS), a practice followed by Queen's University, Belfast, and Loughborough University of Technology in England. The normal expectation of a M.A. or M.Sc. degree is that the holder has completed higher level studies in the same field as his first degree, or one closely-related, the next higher step being the Ph.D. If the M.A./M.Sc. is awarded as the initial qualification, there is no intermediate degree for a research project of a lower level than the Ph. D.

The need for such advanced studies in all areas of the profession is acute. Only in North America has there been an adequate supply of doctoral programmes and candidates. Some other countries have programmes, and most Schools have the intention to begin advanced work in due course, but most Ph.D. holders have gained their doctorates in other subjects, and joined the profession afterwards. We are, it seems, caught in a vicious circle: universities in many countries insist that doctoral candidates and courses must be taught by holders of a doctorate, but not enough Ph.D.'s are available to teach and do the concomitant research. One solution is to send candidates abroad to study in another country where doctoral programmes are available, and the U.S.A. has been particularly helpful in this. But it is costly, and unless students can obtain scholarships, it is unlikely that many librarians will have sufficient resources of their own. Unesco has already helped

to provide two short courses for teachers at the Royal School in Copenhagen, and this would be a good way of raising the level of work, particularly in relation to modern techniques of information storage and retrieval for students from developing countries where the need for highly qualified personnel is acute.

A second alternative is to import specialists from abroad. Many Schools in developing countries in Africa have had to rely on expatriates, and have had hard work to find and train local counterparts. The Universities of Ghana, Ibadan and Ahmadu Bello in Nigeria, and the University of the West Indies, still have expatriate staff, and the uncertain career of the School at Makerere, even though funded until recently by Unesco, illustrates the problems arising from such a shaky foundation. On the other hand, the FID has sponsored successful courses for several years at the Ali Bach Hamba Institute in Tunis, and Unesco has helped to establish a new School of Information Science at Rabat, Morocco, through the United Nations Development Programme, with the assistance of Dr. Nasser Sharify of the Pratt Institute in Brooklyn, New York. The M.Sc. course at the Instituto Brasileiro do Bibliografía e Documentacão (IBBD) in Rio de Janeiro, with financial help from the Organisation of American States and the British Council, has run successfully for several years with teachers imported from the U.S.A. and U.K. to give specific courses. These have been able to benefit from the extensive experience already present in the IBBD in organising and publishing computerised information and documentation services, and this would certainly seem to be an essential part of the local infrastructure. There seems little to be gained from the employment of foreign experts in such specialised areas unless there exists an adequate local base of this kind.

1.7 Teaching Methods

As could be expected, advanced technical aids to teaching such as computers are only used where there is easy access to the necessary machines; a few Schools are fortunate enough to own such equipment, but several are able to borrow time and assistance from other departments. Some, like the Georgia Institute of Technology, are developing novel methods of teaching based on machine retrieval of video-tape recordings and similar techniques. This enables a student to benefit from recorded lectures, and work at his own pace; course notes, reading lists and other printed or taped ancillary material may be used, and this is perhaps the most extensive use so far of computer-assisted learning. In this respect, it may be that such Schools are (even if unwittingly) among the leaders in this new part of Educational Technology, which is still regarded with some caution among computer specialists and educators. It represents an ingenious combination of automatic retrieval methods with the use of audio-visual aids to teaching which are already well-known.

Most Schools in practice rely heavily on the traditional lecture and seminar approach, the proportion varying according to the inclination and skill of the teacher. Since the invention of printing, there has been, in principle, no reason for the continued use of lecturing for the mere imparting of information, which could be read at leisure in a book. The fact that lecturing continues to be the main teaching method indicates, correctly enough, that there is more to it than reciting what the teacher knows so that the students may commit it to memory in their turn. Even the most jaded of students (and lecturers) will still flock to hear and see a popular and charismatic speaker, and his personality is undoubtedly a potent factor in the success with which he communicates. Some of this can be captured by a video-tape, and this method may become much more widely used, though it must be stressed that to make a successful video-tape recording requires special skills that have to be learnt; experience suggests that it is not enough simply to record even a popular and competent lecturer.

The University of Western Ontario reports a complete change from lectures to seminars, as more in keeping with a graduate level of work. Small teams of students are allocated a topic to prepare in consultation with a supervisor, and the teams presents the resulting paper as a group. Thus every student is called upon to take an active role in the course, but is not singled out as an isolated target, as is usually the case with a seminar.

Audio tapes and discs have been used, but not particularly widely. It is difficult, even with the aid of course notes, to compensate for the personal presence of the speaker and his use of a blackboard, or, as is now more likely, an overhead projector. This projector is probably the most widely used of all aids now; it has the great advantage that it can be used for projecting prepared material, for writing during a lecture, or for a combination of both. As yet, hardly any prepared material is available in our field, but there is no reason why this should not become a useful medium for limited publication of specialised material.

Similarly, films and filmstrips are in common use, but so far there have been very few films that could be said to be professional and artistic successes. The former National Lending Library for Science and Technology, now part of the British Library Lending Division, has made available a severely practical film of its operation, and the Open University of the U.K. has recently made two films on library use. As this kind of "University of the Air" becomes more widespread, there should be encouragement and scope for greater development in this area.

One of the most elaborate and successful uses of audio-visual techniques has been the course prepared for Unesco by the Department of Information Science at the University of Buenos Aires. This comprises a complete introductory course, rather more elementary than university level because it is aimed at helping developing countries to train library assistants quickly and with minimum resources. It uses sound film, slides and course notes and has been widely used in Central and South America. The first (and so far only) version is in Spanish, but a French version is in preparation. The course was prepared by Director Juarroz and Professor Josefa Sabor of the University of Buenos Aires.

In courses where computer studies form a large part of the syllabus, new methods have had to be introduced in order to demonstrate and use the equipment successfully. Apart from this, the application of other modern methods and aids to teaching has been proceeding, but somewhat slowly. In the U.S.A. and U.K., for example, many secondary schools are some way in advance of universities, in the development of the so-called "Resource Centre", or "Instructional Materials Centre", where all kinds of different materials are prepared, classified and indexed for classroom use.

1.8 Conclusions

The reports show a very great variety, not only in the actual subjects taught, but also in their various permutations and combinations. From this point of view the only conclusions that might have general validity would be very broad; this would not necessarily make them insignificant, since all comparative studies show much the same sort of result, and if the comparative method is used correctly, it can arrive at the formulation of certain principles which would have significance in specific circumstances. The answers to the questionnaire point once again to the dangers inherent in the use of this method, particularly in an international context. For example the answers to certain questions, such as the number of hours spent on various activities, are not really comparable, although they seem to be. This is because from other evidence, it can be deduced with certainty that the respondents are not in fact replying to the same question, or interpreting the question in the same way. In any future exercise of this character, therefore, more explanations will be needed to make precise the point of any question which may have

the slightest ambiguity, or the conclusions will be inaccurate and misleading. It almost goes without saying that all respondents to a questionnaire should have the same context in mind when making their replies, yet this one of the commonest difficulties arising from the use of this technique.

Some conclusions which may be drawn on the basis of the survey, and of other evidence - the literature, personal contact, etc., - include the following:-

a) Theory and Practice. Perhaps the most important feature of all education for information work, as for any vocation, is the absolute necessity to arrive at some means for relating theory to practice. The theoretical content of courses seems to vary considerably, and in some cases, particularly in those courses with a strong bias towards computer science, it would appear that such practical work as exists is related to the operation of computers per se, and it is by no means universal that this sort of operation would be directly related to an actual library/information service context. However academic the course, the theoretical foundation must be used as a guide to practice, and a pointer towards future developments; it should not be used merely to explain current practice if it is to be in any way productive for the future. Courses which use their theoretical foundation merely to describe the principles of current operational practice are not serving as a guideline for the future. Equally, theory must be tested in practice if it is to be at all realistic. There is no point in teaching the young students practices which are hallowed by time, unless these are related to a forward-looking theoretical basis. The ways in which theory and practice are related in actual courses vary, but it emerges clearly that it is not sufficient for the students to be sent away to work in an operational situation; their practical work should be guided by their own school supervisors if they are to make the maximum advantage of it.

b) Research. The role of research is equally obscure, but at the moment it tends to be extremely academic. This is not recommend that "research" should be regarded as mere "trouble-shooting" that is to say aimed at the solution of practical problems as they arise in a completely empirical fashion. But unless research programmes are tested against real life situations they are liable to become ends in themselves, more and more distant from the actual operational situation. The ultimate aim of research should be the understanding of the social role of an information service and the best technical means of carrying out that role. So far as can be seen from the survey most of what is called research tends to be on technical matters, and there would therefore appear to be a need for more attention to the sociological aspects.

c) The Vocational Element in Initial Courses. This follows from a consideration of (a) and (b). No matter what kind of institution the initial courses are located in, whether in technical high schools, universities, other types of university or equivalent institution of higher learning, no matter how academic the orientation of the institution may be, it has to be remembered that initial courses are directed towards furnishing the student with a vocational education. The unity of theory and practice plays the most important part in this, and it is here that an academic institution has most to offer if this relationship is tackled in the right way, namely to give the student a firm grounding in principles, but always orienting the discussion of those principles towards the practical situations in which the students will have to work.

d) Analysis of Social Role. As outlined in (b), it seems that too little attention is paid to the social or vocational role in initial courses, as well as at the research level. It is true that schools do run courses with vague titles such as "the library in society", and there are reports in the literature of meetings and conferences convened by schools to duscuss social questions, such as that held in the University of Maryland under the title Frontiers in Librarianship, in 1969.

It is not clear, however, how much efforts of this kind are actually related to teaching programmes in general. VINITI, it is true, consistently stresses that we are engaged in a social science, and there should perhaps be more emphasis on the integration of this aspect with the technical.

e) International and Comparative Studies hardly exist. There are some course, particularly in the U.K., at the librarianship end of the spectrum of activities, but very little has been done on a comparative basis in information science. Perhaps the defects of this survey may serve to stimulate further investigations in this area.

f) Content of Courses. It is clear that more attention should be given to the overall structure of courses. In the traditional Schools, there has certainly been an effort to integrate the newly-developing disciplines into the established curriculum, but this has often been at the expense of the new, so that they play too little part in the course as a whole. On the other hand where new courses have been developed with the new disciplines particularly in mind, they have tended to abandon large parts of the traditional curricula, or even start totally new courses. This applies particularly, of course, to the areas involved with computer science. The question that has to be answered, is, should the newly-developing courses be an integration of the new and the old, with a reasonable balance preserved, or should they be merely an aggregate of separate courses given by different lecturers without regard to the overall structure? There can scarcely be two ways about this; the answer must be that future courses should be an integration rather than an aggregation.

g) Training of Teachers. Hardly any Schools report that they have been able to recruit teaching staff with a proper grounding in pedagogy. Presumably, nearly all the teaching staffs have been recruited from the body of experienced professionals. Certainly, courses like the one at the Royal School of Librarianship in Copenhagen exist, but these are mostly of a short-term nature. A new course has begun at Loughborough University of Technology in October 1974, which will provide a Master's degree course for qualified librarians who wish to become lecturers; at the same time, a course in Education for non-graduate Chartered Librarians has begun in London at the Froebel Institute College of Education, directed particularly towards the production of teacher-librarians who have both a librarianship and a teaching qualification. There is no doubt that if more lecturers had a teaching course, then some of the problems outlined above would be given closer attention.

h) Use of Educational Technology. The same argument as in (g) applies to the use of advanced teaching methods. There is very little indication that these are being systematically brought into use, and where some use is reported, it tends to be allied to, for example, a course in computer science; this not to argue for more computer assisted instruction, which in educational circles is viewed with considerable caution, but the better use of audio-visual aids, particularly in providing material for courses in developing countries, could well be the subject of further investigation.

i) General. There has been great difficulty in gathering this information, but now that these tables exist, they might perhaps be used as a basis for several future programmes of work. If this is the case, it will be necessary to correct the errors that exist here, to add more explanatory material so that the questions are all answered on approximately the same basis. But what does emerge clearly is that most countries are facing the same sort of problems, and the exchange of information and experience should be a valuable aid in planning future development. It seems therefore desirable that the FID should try to continue collecting information of this kind, since education for library and information science is now clearly in a process of transition, and all successful forward planning must in future be based on an adequate supply of reliable information. Without wishing to claim too much for the data that has been collected and tabulated here, it could reasonably be claimed that

they provide at least the basis for systematically developing the necessary standardising, tabulating, and collecting activities that will provide a more secure foundation for the future planning of professional education.

J) Intergovernmental Conference on the Planning of National Documentation, Library and Archives Infrastructures.

This Conference, held at Unesco in Paris from 23-27 September 1974, included a Working Group on Planning Information Manpower, and received a background paper prepared by Professor P. Havard-Williams and Dr. E.O. Frantz. The Working Group considered the following ideas on trends:

(1) standards are required for establishing national needs;

(2) there is need for quantitative as well as qualitative assessment of manpower requirements for various levels and specialisations;

(3) accurate information on existing staff and operations is required as bases for meaningful and adequate projections for future national manpower need for the categories of personnel;

(4) the analysis of present resources as basis for projections for the future is difficult in the absence of certain basic requirements:
(a) a clear and internationally agreed defintion of different levels of staff;
(b) clear and internationally agreed statistical procedures for statistical investigations;

(5) there is no comparative survey of what exists and therefore deduction of approximate standards. This is required as the basis for future development and design of new structures especially for developing countries with pertinent figures as suggested in the Delmas Report on Planning national infrastructures.

Three main groups of personnel were identified:

(a) personnel responsible for research in design, control and development of information systems;

(b) personnel directly concerned with executing documentation, library and archives processes and functions;

(c) personnel supporting the work of the (b) group, i.e. operational, executive and technological as well as administrative, management and secretarial functions.

In considering characteristics of professional posts in terms of subject background, methodological and management operations the following categories or levels were identified:

(i) subject, methodological knowledge and management knowledge - for managers of large institutions and information systems at top level, also for heads of services and specialists;

(ii) subject and methodological knowledge for evaluation and processing of documents and data, and for answering users' requests needing subject knowledge - for research personnel specially in information science and documentation;

(iii) methodological knowledge: operation of system which requires no subject knowledge for professional staff;

(iv) methodology for routine work: doing routine operations, serving levels (ii) and (iii) - for assistants or technical assistants.

The Conference agreed that planning of manpower needs should be conducted at the national level, and that a balance has to be maintained between the various groups of personnel. There was also general approval of the idea that professional level courses should be conducted in universities or equivalent institutions of higher learning, though it was recognised that this might present difficulties in developing countries with a shortage of graduates and of university places. Thus there would be a continuing need for adequate training courses for middle-level personnel, with provision for upward mobility between the levels.

Those countries with well-developed information services may be able to continue their programmes of highly individual courses, particularly where universities have complete autonomy in planning their syllabuses. Experience with such courses will certainly contribute to exploring the frontiers of professional knowledge and helping to advance professional practice. But the Working Group considered that the advantages of integrating courses based on a common core for information scientists, librarians and archivists are too great to be ignored, and where resources are limited there can be no dount that such integration is most efficient, both in the economic use of teaching and other resources, and in national planning for an adequate supply of appropriately trained personnel. The examples of Dakar and the Lebanon were cited to show that, where national resources may be too small to be self-sufficient, regional centres can be successful in concentrating the programmes within one institution serving the whole region.

Most of the problems identified by the present Survey were discussed by the Working Group and in the plenary sessions, and while there was general agreement on the points outlined above, it was also recognised that more study needs to be made in several matters: clarifying terminology, such as the difference between "education" and "training"; the place of practical work in professional courses; and the difficult task of providing adequately trained teachers, particularly in developing countries, where reliance on expatriates does not provide a permanent solution although it may be the only possible means of beginning a programme. All the international organisations should give their attention to this, and endeavour to foster the wider growth of courses for potential teachers such as those at Copenhagen and Loughborough.

It was not to be expected that a single part of a single conference would provide solutions to these problems at a stroke. Nevertheless, much valuable discussion took place, which seems to confirm the impressions gained from this Survey, that despite the many and valuable differences in specialisations, there does seem to exist a wide area of agreement upon the subjects which, while differing perhaps in emphasis, do constitute the basic core which all professionals in library and information science need to know; and that the profession now has the potential to develop both its foundations and its growth points, to enable its members to improve their practice and hence their contribution to the progress of society.

It is the hope of the FID and of Unesco that the issue of this document will help to further these discussions by stimulating interest in continuing the investigations begun and recorded here.

PART 2 National Surveys

The following selected surveys have been compiled partly from the replies to the questionnaire and partly from information supplied directly by these countries. It has not proved possible to cover the entire world, but it is hoped that there is a sufficient body of discussion to make the inclusion of this Part 2 worthwhile. Now that the present surveys have been made, it would seem to be desirable for the FID to continue to collect and publish similar reviews, both from other important countries and regions, and from the countries included here, giving news of their progress in a rather rapidly developing field.

2.1 Czechoslovakia

At present, studies of library science and scientific information take five years at the Chair of Library Science and Scientific Information in the Philosophy Faculty of Charles University, Prague. These studies comprise three specialisations:

cultural education (public libraries)
technical education (technical information)
natural sciences (scientific information in biology etc.).

Studies of library science and scientific information at the Philosophy Faculty of the Komensky (Comenius) University in Bratislava also take five years but are combined with one other subject of the Philosophy Faculty.

Students who finish these studies may sit for the graduating examinations and be granted the title of Doctor of Philosophy.

The number of full-time students at both these Chairs was about 20-35 during each of the last few years; approximately the same number have studied part-time and extramurally.

A two-year extramural postgraduate course of scientific information was already organised several times for graduates of other universities and colleges working in the information system. A further course started in 1973, with 40 students.

New proposals and intentions have been worked out within the framework of the State scientific research task called "Education of Information Workers". The following papers have been worked out in this context: "Proposals for the qualification needs of information workers". The core of the Report is a set of tables in which the output of a certain activity is aligned with the required level of education and suitable teaching curricula. The probable development for the future is fixed for each given activity, and the profiles of the information workers are defined as follows:

University education:

Information worker - specialist	Professional librarian
Information worker	Leading librarian
Leading (managing) information worker	Scientific research or scientific pedagogical worker
Scientific research or scientific pedagogical worker	

Secondary-school education:

Information worker with secondary-school education	Librarian

"Information core of the university curricula and thesis for the disciplines of the information core":

1. Introduction to Informatics
2. Quantitative methods in Informatics
3. Psychology and pedagogics of the users
4. Information sources
5. Technological means
6. Acquisition
7. Information analysis
8. Identification and description of information sources
9. Pertinent filing
10. Selection and distribution
11. Organisation and Management of information systems
12. History of libraries and information systems.

The subjects of the information core are to form the content of the first two years of day and extramural studies at the Chair of Library Science and Scientific Information at Charles University in Prague. At the same time it is presumed, that in a reduced form, they would become the basis for pregraduate studies (most probably as specialisations) at other universities where information specialists would be trained, or postgraduate studies at the Chair for Library and Information Science for the preparation of specialised information workers.

It is presumed that university studies will be divided into two specialisations:

- scientific information
- public libraries.

In addition, specialisation in subject branches such as technology, medicine etc. is also envisaged.

The following types of postgraduate studies are expected:

(a) postgraduate studies specialised in Informatics
(b) postgraduate studies specialised according to professions for graduates of the Chair for Library and Information Science
(c) postgraduate studies suitable for graduates from other universities.

Training of scientific workers:

In 1972 a proposal was worked out enabling "Informatics" to be introduced as a scientific discipline into the list of subjects for which scientific titles are awarded. The proposal suggests that the new scientific discipline should have the following structure:

"Library and information science"

Compulsory discipline:	Theory of social information
Optional discipline:	Theory of scientific information
	Information analysis of text
	Theory of information systems
	Applied computer technology
	Book Science
	Theory of library systems
	Theory of bibliography
	Theory of information education
	History of library-information systems.

Other Information Workers may follow two years of post-matriculation studies of scientific, technical and economic information at the Secondary Schools for Librarians in Prague, Brno or Bratislava. New proposals and intentions have been worked out within the framework of the scientific research State task "Education of Information Workers", as follows:

In 1972 and 1973 the following questions were solved:

- survey on working and studying profiles of secondary-school qualified information workers;
- evaluation of curricula and plans for post-matriculation studies of scientific, technical and economic information at secondary librarian schools from the aspect of experience with the teaching of the individual subjects;
- survey of the employment and utilization of graduates from secondary librarian schools.

The results of the above-mentioned reports form the basis for the determination of the profile of graduates with secondary information education as well as for the compilation of teaching plans and curricula.

Proposals for a four years lasting secondary education on scientific, technical and economic information with alternative curricula have been worked out. Three documents are waiting to be analysed and evaluated:

(1) Proposal for the curriculum of four years lasting studies of scientific information - a new subject for Secondary Schools of Librarianship.
(2) Cooperation and evaluation of selected curricula of secondary vocational schools and secondary librarian schools.
(3) Motivation of the new study subject for four years lasting studies of scientific, technical and economic information at secondary librarian schools.

Apart from preparing the four years of studies of scientific, technical and economic information, modifications in the curriculum of the two years post-matriculation information course are also planned.

This task is to introduce education in information studies for Secondary School graduates; it does not treat education of librarians for public libraries.

The curricula are planned to be finished in 1974, the same applies for the textbooks. The studies are to start in 1975.

Extramural Education of Information Personnel:

Extramural education of information personnel is at present a matter of the following organisations:

- Central Office of Scientific, Technical and Economic Information - State Central Technical Library
- State Scientific Libraries in the Districts
- Branch Information Centres
- Czechoslovak Scientific and Technological Society.

Central Office of Scientific, Technical and Economic Information - State Central Technical Library :

Yearly post-matriculation course for information workers since 1968; three-monthly course for librarians of information centres since 1968; specialised courses (with accommodation in the school building) since 1969. Students from various branches and departments.

Scientific State Libraries in the Districts:

Yearly post-matriculation course for information personnel (in Ostrava since 1970, in Brno 1972-73). Similar training also in the Slovak Technical Library; three-monthly course for librarians of information centres (Brno, Liberec).

Branches:

Weekly course, 1st to 3rd level, for information personnel. The curricula correspond approximately to the curricula recommended in the material of the State Information Policy (SIP) tasks (agriculture, health service, machine industry; selected training of information personnel (agriculture, health service, maching industry; instruction courses for personnel of the newly founded information departments (agriculture); 1-3 weekly training visits in information centres of a higher level (health service); seminars (agriculture, energetics, machine industry etc.).

New proposals and intentions have been worked out within the framework of the solution of the scientific research state task "Education of Information Workers":

The solution is based on the analysis of the present state in Czechoslovakia and abroad in this subject field and on the fact that the task of extramural education is the following:

(a) to complete some part missing in the qualification of people working in the information system;
(b) to offer further education (additional training) to information personnel who already have a full qualification for their job.

The outline of the basic concept of extramural education for information personnel arrived at in Czechoslovakia contains the following:

the proposal of an organisation for extramural education including the foundation of a central methodological and co-ordinating institution for question concerning the education of information workers;

determination of the profiles of information workers for extramural education purposes;

framework for the content and forms of extramural education;

the proposal for the measures needed for realisation.

2.2 Federal Republic of Germany

The educational system for information and documentation in the Federal Republic of Germany is characterised by the three different courses of careers being offered by the civil service:

(1) Senior professional staff, requiring an academic degree like diploma or a M.A.
(2) Professional staff, requiring a specific certificate of an institution for specialized training
(3) Assistant level, vocational training required.

Traditionally, education and training on the university level therefore only applied to level (1).

Since education and training for librarianship and documentation/information science are for historical reasons separated, both are being undertaken in different institutions and in different surroundings.

- In librarianship, training for the higher level requires first an academic degree. The kind of degree varies in the different "Länder" of the Federal Republic, mostly a doctorate is required. Applicants for the higher level then are first trained in their host service for 1-2 years by in-service training and then get a theoretical cours (1 year) at the Academy for Librarianship at Cologne. This kind of training is based on an agreement of the Länder governments of the Federal Republic. Although this training has the form of a postgraduate training, it in fact is not, because the Academy for Librarianship at Cologne is not an official part of the university, but is assigned to the university library.

- In documentation, training for the higher level is only undertaken by the "Lehrinstitut für Dokumentation" of the German Documentation Society at Frankfurt (financed by the "Institut für Dokumentationswesen"). The training requires an academic degree, too, but is not officially acknowledged by either the Federal of the Länder governments. The applicant gets 1-2 years in-service training in his host institution and a theoretical course at the Lehrinstitut (nearly 1 year). Although this training is located on the level of post-graduate training, it cannot be considered as such, because the Lehrinstitut is a private institution without government acknowledgement.

During the last four years two new possibilities for education and training on a university level have developed as far as documentation/information science is concerned. They are:

- Post-university training at the Zentralstelle für maschinelle Dokumentation (ZMD). Although the Zentralstelle is not an officially accepted training institution, it organised with financial support from the "Institut für Dokumentationswesen" two one-year courses for graduates in mathematics (or a similar subject). Training then particularly in their own research department. This training is not officially acknowledged and may not be seen as training for documentation, but for the specific tasks of an information scientist (information systems designer).

- Study of information and documentation science at the Free University of Berlin. Since 1966, information and documentation science may be studied on a minor for the M.A.; since 1969, it is possible to study it as the major for the M.A. and to do the philosophical dissertation thesis in this subject.

Whereas the post-university training can be seen as an intermediary action to train people for information science tasks in the meantime, where the universities do not provide the field with enough specifically educated people, the major trend for the Federal Republic of Germany will be the integration of education and training for documentation/information science into the university. The first approach is that, at the Free University of Berlin (other universities will follow as the University of Düsseldorf), several different ways to enter the profession are seen:

- Studying information and documentation science as a major (with two minor subjects). The courses will run for 4 years and lead to a M.A. with information and documentation as major subject (a specific diploma for information science perhaps will be established in some years). The courses include the following main subjects:

- theory and methods of information systems
- sociology and psychology of information
- politics and law of information
- linguistics, documentary languages
- information technology
- economics of information and systems analysis
- information work.

The graduates of this course will work as information scientists (e.g. design of information systems, information policy, research).

- A second way to reach the aim of an information scientist may be to graduate in an adjoining subject (like computer science, sociology, linguistics) and then complete a two-year postgraduate study of information and documentation science (leading to a Ph.D. in information and documentation science).

- Studying information and documentation science as a minor subject in any M.A., diploma or similar programme (at the moment not possible for all subjects). This will lead to a qualification which is comparable to the theoretical course at the Lehrinstitut (thus enabling the trainee to take over posts where both subject and methodological knowledge is needed). The courses include the following main subjects:
  - sociology and psychology of information
  - state of the information field
  - administration and law of information sciences
  - linguistics, documentary languages
  - information technology
  - methods of information analysis and distribution

- A second way to enter the documentalist profession may be to graduate in a subject and then complete a two-year postgraduate course.

Although the programme at the Free University of Berlin is just in a natal phase, it clearly points out which trends may be followed in the Federal Republic of Germany in the following years. At the same time, it can be seen that similar trends occur in the other areas of education and training in the information field:

- There are plans to integrate training for senior librarians into the university programmes. This perhaps will be done more on the postgraduate level, but there is a good chance that this type of training perhaps can be integrated with the curricula of information science (taking information science as a roof for both, librarianship and documentation).

- There is considerable amount of education and training in the field of computer science, where perhaps courses for the intersection between computer science and information science may emerge.

- Even the training for level (2) could be integrated to some extent into the university surrounding. For example the Institute for Training in Librarianship in Berlin (West) now is a part of the Free University of Berlin.

These trends indicate two main lines of development which are hoped to be realized within the next two decades:

- Integration of training and education for librarianship and documentation in a way that graduates of this training fit as well into librarianship as into documentation.

- Integration of education and training for the information field into the university surrounding.

- Making the system of different courses for different professional levels more permeable that a student of one level may easily go over to courses allowing him to get the qualification for a higher level.

- Improvement of education of highly qualified information scientists being aware of the fact that their area of work is something different than that of the information workers (providing other people with information).

2.3 France

Until now the French university system has played a very limited role in the professional education for information science (documentalists or librarians). This statement can be partially explained by certain characteristics of French university education, which is in practice traditionally given by two major categories of institution which differ widely from one another and until now have had very little contact with one another.

Universities properly so called are concerned with cultural and scientific subjects rather than professional. Among the departments which they comprise, formerly called faculties now units of teaching and research, only those in medicine impinged directly on the practice of a profession. The others give an education which provides access to channels of recruitment or to complementary and pre-professional education. On the other hand, universities have a monopoly in giving university degrees after the baccalauréat up to the doctorate, through the licence, masters degrees etc.

The Grandes Ecoles and the State School of Engineering make a completely different category. They recruit a limited number of students by public examination, often in a highly selective manner. They do not give university degrees, but either prepare their students for entrance to national examinations or, and more often, give their own leaving diploma: these qualifications give direct access to high level categories of employment in the public service or in private enterprise.

A situation intermediate between these two and less easy to define is occupied by the large public institutions, "of scientific and cultural character". Certain of these, like the Collège de France and the Ecole Pratique des Hautes Etudes give an education which is at a high scientific level but "disinterested", that is that it does not aim at giving access to any specific career. Others like the Institut d'Etudes Politiques de Paris or the Observatoire de Paris have functions which are much more comparable to those of a specialist university and in 1974 they have just obtained the right to award doctorate degrees.

The universities do not concern themselves with applied studies and do not rate highly applied sciences. They have no knowledge of information science and regard it only as a technical matter. In fact, the idea of a technical university does not exist in the French university tradition. The Schools for their part do not regard jobs in information work as relevant to their vocation, and would not consider the idea of training engineers in documentation, in information, in library science.

There is one exception: the very old Ecole des Chartes which trains mostly archivists, but which each year directs a proportion of its students towards careers as keepers in public libraries, national libraries and university libraries. But the education in this School is still centred on the classical disciplines of philology, history and the auxilliary sciences of history such as palaeography and numismatics. This School trains people for study and scholarship rather than for the arts of communication.

Institutions which are above the level of secondary education and prepare people for the professions of documentation are thus outside the universities. Because of this their technical and professional character is emphasised and only occasionally is there a firm link with research.

The Ecole Nationale Supérieure des Bibliothèques belongs to the Direction des Bibliothèques and therefore to the public provision of reading, and not to the Directorate of Education in the Ministère de l'Education Nationale. This School recruits by examination students who already possess a licence, and have therefore completed at least three years of post-secondary study. It gives them a year of training oriented towards employment in libraries which belong to the same Directorate. A project for extending the length of studies to two years has been discussed for several years but has not yet been put into practice.

The Ecole des Bibliothécaires-Documentalistes of the Institut Catholique de Paris, which is a private establishment of higher education, belongs equally to the classicale tradition in librarianship. It recruits its students at the level either of the baccalauréat or of the licence; the length of studies at the moment is two years. The training has a strongly practical character and its diplomas are generally highly valued in libraries belonging to the private sector. The training also includes several weeks of practical work.

The Institut National des Techniques de la Documentation which began as the result of a private initiative taken by the Union Française des Organismes de Documentation was attached in 1950 to the Conservatoire National des Arts et Métiers as an autonomous institute. Since 1970 it has offered two different courses of study. The first is open to students with a bachelor's degree, with an entrance examination; the courses last two years on a part-time basis of a hundred and twenty hours of lectures and supervised work each year; it leads to a technical diploma of documentalist. The second is open to candidates who have already completed a first course of higher education or who have already had professional experience; the courses last one year of full-time study or two to four years of part-time study, and include a period of two months of practical work. These courses lead to the higher diploma in the sciences and techniques of information and documentation. These two diplomas are mainly helpful in obtaining employments in documentation centres and services in the private sector.

After 1967, the universities have begun to take a place in this system. This has been done first of all in the area of short time higher education, in the form of university institutes of technology which will give a two years' training as a higher technician to students having the baccalauréat.

The IUT are organised on the basis of specialist departments which cover a very wide range of specialisations. Seven of them, in different provincial cities, have a department of "Careers in Information Work" in which are offered an option in "documentation". Some of these departments have also begun a "special year" which recruits candidates who have already obtained a licence in another discipline and in one year give them a university diploma in technology which their colleagues obtain in two years. The programme of the IUT makes an important contribution to general culture also, in the study of languages etc. Teaching in the technologies is usually given by professionals in practice who give up part of their time to this educational activity. The students should also in principle have a period of practical work, but this is not always possible to organise.

At a higher level the Institut d'Etudes Politiques de Paris has begun in 1969 a Cycle Supérieur de Spécialisation en Information et Documentation. This recruits by public examination a limited number of students who already possess a masters degree in one of the social or human sciences. The studies last for one year full-time. The function of some of them is to raise the mental and logical level of the

students, for example in mathematics, informatics, linguistics; the others are directed towards technical subjects. The objective is to train information workers who have an overall vies of the problems of information transfer and will be capable of adapting themselves to different circumstances mastering the necessary techniques, and able to reach posts of responsibility quickly. The year of teaching is split up by several periods of practical work of some weeks, and at the end there is a compulsory period of three months of practical work.

Among the holders of the higher specialist diploma which this Cycle leads to, some go on to a third course of study which will lead them to obtaining the doctorate. Since June 1973 there is a specialist doctorate in the sciences of information and communication. This doctorate may also be taken under the supervision of the two branches of study at the Ecole Pratique des Hautes Etudes, 6th section. It is oriented towards research and the teaching is consequently mostly on the theoretical level.

More recently there have been instituted some new masters degrees in science and technology. In this new programme, three universities have begun on an experimental basis a course which will lead to the obtaining of a masters degree in the sciences and techniques of information or communication. In the first period, students who have obtained the diploma at the end of the first cycle of study in another specialisation have to follow for one year a course for a preparatory certificate, and afterwards are admitted to the courses for the masters degree proper, lasting for two years. None of these masters degrees have yet been awarded and it is therefore not yet possible to describe them in any more detail.

2.4 Hungary

The most important form of the university-level training of information workers in Hungary is the "high-level" course in documentation, first organised jointly by the Chair of Library Science of the Eötvös Loránd University (ELTE) and the Hungarian Central Technical Library and Documentation Centre (OMKDK) in the academic year 1963-1964, and since then - according to needs - on an average every two years.

Higher education in librarianship was started as an independent major course in the Faculty of Philosophy of the then University of Budapest (now ELTE) in the academic year 1948-1949, first as a six-semester course, then gradually growing into a regular ten-semester course; at present there are also evening and correspondence courses. Characteristic of both directions of education (i.e. training of information specialists and education of librarians) are the following:

- the content of training has been modified continuously, and is still changing: this is partly on account of the comparatively rapid development of the theory and practice of information and library science, partly because of the increasing and differentiated demands on manpower and information arising from Hungary's R and D effort, industry, agriculture, and other special fields;

- the body of knowledge in the field of information and library science is included equally in the respective curricula of training courses in information and of higher education in special librarianship, but the ratio of special subjects varies according to the respective educational orientation;

- the current forms of training and education at university level are now in the process of further development: priority is, however, given to setting up and developing a training system for information workers.

Information specialists:

In pursuance of the Decree No. 148/1962/M.K.15/ of the Ministry of Education, the high level course in documentation in the ELTE is under the auspices of the ELTE Chair of Library Science. This course is one year (2 semesters or 120 class-hours). On its completion, students who pass the examination are granted by the Chair a certificate of high-level training in this special field.

Admittable to this course are only non-library science major university or college graduates who have been engaged in information work for at least two years, with such a working knowledge of two foreign languages as is necessary to documentation work.

The main subjects of the course are as follows:

Information system of the national economy
Special librarianship
Studies in bibliography
Classification, indexing
Sources of documentation work
Processing and publishing work in documentation
Literature search and exercises in documentation
Machine-based punched card techniques and the mechanisation of information systems
Manual punched card techniques
Reprography, microfilm techniques
Technical propaganda work.

This documentation course was organised three times with a strong orientation to science, technology, and agriculture, and once to social science. Participating in the course is an average of 40 students.

The lecturers are generally faculty members and OMKDK staff members, and include in their reading-lists, in addition to the Hungarian authors, works by Mikhailov, Cherny, Gilyarevskiy, Vickery, Collison and others. For the analysis of information sources, the entire information apparatus and stock of the OMKDK are at the students' disposal. Students are acquainted with the new techniques in information processes in the courses "Mechanisation of information systems" and "Reprography".

However, experience has shown that the 120 class-hours seem insufficient to the up-to-date and full transmission of this special knowledge; therefore, the Chair now plans to reorganise the one-year course into a two-year (240 class-hours) system. Methods adopted in the training course include lecture, demonstration, practical work, instructional visits.

Another university-level institution for the training of information workers is the Extension Training Institute of the Budapest Polytechnical University (BME). The Institute's primary task is the extension training of engineers, first of all in the technological field, in the strict sense. At the same time, part of the course-types elaborated by the Institute is concerned with interdisciplinary studies or with special engineering works affecting several or many technological fields. Thus, since 1960, several courses of extension training type have been organised which deal with the problem or with certain particular problems of technical and economic information.

In addition to the BME Extension Training Institute, regularly participating both in the organisation of courses and in teaching are the OMKDK, the Institute for Technical and Scientific Information of the Ministry of Metallurgy and Machine Industry (KGM MTTI), the Information Centre for Construction (ETI), and the Federation of Technical and Scientific Societies (MTESZ). The average number of class-hours in these courses is 40. No certification or diploma is granted, students are

given only an attendance certification, but the content and the high standard of this course attract many technical experts interested in this field. Some of the courses organised in recent years:

- "The significance and use of technical and economic information is preparing decisions on development in industrial companies" - a 40-hour day-time course;
- "Information on patents" - a 36-hour day-time course;
- "Technical and literature information in chemical industry" - a six times two-hour course for information users;
- "Up-to-date technical and economic information" - a 40-hour course for information workers in the field of construction and building industry.

The courses are primarily practical in character; theoretical problems are treated in such a depth only as are necessary to the understanding, interpretation and evaluation of information activities. Therefore the teaching methods adopted include, first of all, demonstration, practical work and instructional visits.

Education in librarianship:

The objective of the Chair of Library Science of the ELTE is "to educate expert librarians who are adquately prepared, both ideologically and professionally, to perform functions, requiring higher educational background, in various types of libraries and information institutions". The course is 5 years (regular or day-time course), and 6 years in correspondence and evening courses. On completing their studies, students have to pass a national examination and are granted a library science diploma (university level). University education involves two major study fields, i.e. students of library science obtain a second diploma, too, which qualifies them, generally, to fill teaching posts in secondary schools. The university curriculum is as follows:

Fundamentals of communications theory
Rudiments of bibliology
Introduction to sociology
Studies on reading
Basic principles of public education
Theory of education and culture
The history of writing, book, press and libraries (from antiquity up to now)
Theory of cataloguing
Cataloguing practice
Theory of classification
Practice in classification
Information retrieval systems
Information: bibliography and documentation
Practice in bibliography and documentation
Studies in librarianship
Library practices
\+ Seminars
\+ Special seminars
\+ Special courses and seminars

\+ elective compulsory seminars

Beginning the academic year 1973-1974, a weekly two-hour course "Exercises in computation technique" has been introduced in the second term of the third year, which is organised jointly by the Chair of Computation Technique of the ELTE Faculty of Science. The present teaching programme, shown above, has taken shape on the basis of experience gained over the past few years. As compared to the previous years, the development in this field can thus be summarised:

- the number of practical class-hours has surpassed that of theoretical classes, i.e. training for practical work has gained ground;
- the ratio of historical studies has decreased; compulsory core studies for every student are the history of writing, the book, printing, and libraries, as well as a historical introduction to the theoretical subjects. Students who choose palaeography as their special subject field may deepen their historical knowledge by taking up compulsorily elective special courses and seminars;
- included in the Chair's new programme are those courses or studies which tend to point out the social and scientific implications ("environment") of library and information activities, e.g. scientific communication, sociology, theory of education and culture, as well as computer-based processes in information work, including practical work in preparing simpler programmes.

Comparatively less used among the other teaching methods are the audio-visual methods of education and transmission of knowledge. In this field some improvement can be expected since a National Centre for Reading Techniques was set up in 1973 with the objective to propagate and spread the above methods in - among others - university education.

2.5 Netherlands

At the outset it seems useful to make a clear distinction between terms of which the equivalent in Dutch might have a different conception. When we speak of 'opleiding' and translate this by 'training' we mean the imparting of the necessary knowledge and skills to somebody in order to enable him to exercise his trade most effectively.

When we speak of 'vorming', translated by 'education' we mean the imparting of the necessary qualification to somebody in order to enable him to function with the optimum effect in Society.

It is self-evident that 'opleiding' (training) implies 'vorming' (education) and vice versa.

So we may speak of 'training of librarians, documentalists, information specialists' etc. and of 'education of users', such contrary to the use in English.

Apart from this we distinguish 'bijscholingscursussen' (refresher-courses) for professionals as well as for users.

In Dutch for this kind of courses the term 'Application-courses' is used. However, there is some difference between 'refreshing' and 'application'. By 'refreshing-courses' we mean training-programmes with the objective to 'brush-up' already acquired knowledge. 'Bijscholings-cursussen' or 'Application-courses' are meant as additional training-programmes in order to provide additional knowledge of skills. Beyond this we might distinguish 'specialisation' which generally provides (extra) knowledge and skills in a specific sector of the field. The latter kind of training-programmes can be found on

a) university level: at the University of Amsterdam
at the Agricultural University in Wageningen
at the Library-Academy in The Hague (P.A. Teile-academie)

b) on Higher Vocational Training level:
at the Library-Academies (Amsterdam, The Hague)
at the Part-Time Courses of the Joint Training Committee
at the Part-Time Courses for Archivists.

Educational Programma's (Vormings-programma's) in the field of 'Information Work' can be found occasionally at various types of schools, universities, institutions, concerns, etc.

A less specific way of education ('Vorming') is sometimes practised in public libraries: people are told how to proceed in order to obtain books, documents, periodicals, required information in general etc. For this we should like to apply the term 'Enlightening of the user'. As soon as the user acts according to the 'enlightenment' he received we might say that he has been 'educated'.

Training of Professionals:

In the Netherlands those who intend to choose a career in public, academic or special libraries as a member of the (scientific) staff can be trained at the Library Academies, the University of Amsterdam and in part-time courses.

Apart from these, subject-specialists can be trained at the Agricultural University of Wageningen, though according to the above-mentioned distinction we should speak of 'education of subject-specialists'. Strictly speaking we do not train people for specific functions in libraries or information-centres at universities.

What we do, in fact, in Amsterdam, is to provide those who are studying for a doctor's degree with the necessary knowledge and skills to be able to function for instance in an academic library in their own field of study. No possibility exists to take one's degree in 'Information-science' up to now.

We might speak here of 'specialisation'; a biologist may specialise in the field of 'information-science' for instance.

Similar specialisation is possible at the Agricultural University in Wageningen.

On the other hand in Library-Academies and in Part-time courses people are trained to be a librarian, an assistant-librarian, an information-officer etc. After having successfully finished the various training courses they are qualified librarians, assistant-librarians etc.

A fundamental difference exists between the Library-academies and the Part-time courses of the Joint Training Committee:

- to be admitted to a Library Academy one has to have finished a school for continued higher education. Practical experience is not required. (The Library-academies are day schools);
- to be admitted to one of the part-time courses of the J.T.C. one has to have finished at least a school for secondary education and one has to be working in the information field. (There are also correspondence courses);
- to be admitted to the C-study (literature searcher) of the J.T.C. one has to have one's Bachelor-degree in one of the sciences and experience in the field.

The University Courses:

At the University of Amsterdam:
Supernumerary chairs have been instituted for:

a) Library-science
b) Science of the book and bibliography
c) History and Esthetics of the art of printing
d) Documentary information
e) A number of related subjects (as a lectureship).

All these subjects are subsidiary subjects and one cannot take a degree in one (or all) of them. However, they can be chosen as minor subjects for the final examination. This is the case at the Faculty of Literature and with special consent also at other faculties in Amsterdam and at other universities.

This 'education' for 'Scientific Librarian' comprises two academic years, one before, one after the final examination in a degree. The two years need not be successive. In the pre-doctorate year lectures are given on:

- Theory and Practice of Library-science
- History of the Book
- Documentary Information
- Introduction to Bibliography
- Subject's catalogue

In the post-doctorate year the student has to serve in a big library.

In this second year of study lectures of the first year are being continued and other lectures are given on:

- Graphical techniques
- Library-techniqes and automation
- Methodology of Bibliography.

At the end of the second academic year and after the final examination for the doctor's degree, the educational programma is concluded with a colloquium in the presence of members of the State Advisory Counsel for Library Affairs. In future the colloquium will be replaced by a final examination.

Trends in the Development of the Training (Educational) Programme:

A tendency is perceptible to develop the university- and highschool-libraries into scientific information centres. The training of the scientific library official must be adapted to the equirements as the consequence of this trend. This means extension of the curriculum with lectures on the following subjects:

- Library-management:	business economics personnel management financial management science of organisation problems of efficiency market-analysis business psychology
- Advanced technical means:	tele-communication audio-visual aids reprography automation, mechanisation
- Accessibility:	catalogues references classification etc.

At the Agricultural High School Wageningen:

Training (Education) of Subject-Specialists (Literature-Searching and Reporting):

Subject-specialists are trained on university level. In Holland we have no

vocational training for specific functions in the information field at universities or high schools. As at the University of Amsterdam, in Wageningen Bachelors and Masters of Science are educated (trained) to be able to find information and to know where to find it

to adapt it to their specific needs
to publish, to report
to work as literature-searchers etc.

For that purpose special courses have been established for those who have already graduated and those on the bachelor's level. For most of the students these are imperative subjects. In fact a kind of 'users-education' rather than a training programme for a special function. Some of the students who complete these courses come to work in special libraries, others derive benefit from them for their future publications.

During three months one day a week lectures are given in the morning and work-groups are organised in the afternoon on subjects like:

- the development of the information-stream
- objectives of reporting
- literature searching
- systems of planning
- use of language and readability etc.

Science Communication:

The need of a post-bachelor programme for those who do not want to take a degree in the original subject of study but want to graduate in 'Information-Science' in that field is felt in circles closely connected with the information-workers at the Agricultural High School.

Plans are being developed to establish an adequate programme on an experimental base.

Technical Writers:

Technics and Science play an ever increasing part in Society. Parallel to this a growing need of adequate written communication between technicians and scientists is noticeable.

Up to now an appropriate training programme for 'technical writers' has been lacking. A special working-committee has drawn up a provisional curriculum for three groups on different levels:

- on academic level: the graduated technician or scientist who has to report regularly about his work (in laboratories for instance: engineers, accountants, lawyers, medical men, laboratory-assistants etc.)
  : the graduated 'technical writer' on higher level: industrial editors, project-leaders etc.
- on higher vocational level:
  technical writers as copy-writers, technical journalists, scientific translators etc.

The Netherlands Organisation for Information Policy (NOBIN, The Hague) has been invited to cooperate in the organisation of experimental courses for Science Communication and Technical Writing.

Note: 1. At the Technical High School in Delft, Eindhoven and in Twente the preliminary steps for the training of 'technical writers' have been taken.

2. In the so-called 'CAVUB-REPORT' of the Academic Council the following proposals have been made:

   a. to appoint in all university libraries a staff-member who will be charged with the education of students in making use of the library in the most efficient way.

   b. to appoint in all faculties and sub-faculties a staff-member who is responsible for the instruction of students in the use of primary and secondary sources of information with reference to their subject of study.

3. At the Higher Technical School in Utrecht a course 'technical writing' has been established.

4. In industry and commerce the same training programme is offered in 'application-courses'.

Non University Courses; C-Study:

On the academic level (but not at the university) part-time courses exist which train information workers (those who function already in the field) to be Literature-Searchers. To be accepted as a student they have to be 'bachelors' or, in special cases, graduates or on post-vocational high school level. The courses (in The Hague and in Utrecht) organised by the Joint Training Committee are of one year's duration. Lectures are given every fortnight during the morning and in the afternoon with sufficient opportunity for practical work and excursions.

Some of the subjects are:
- Literature-lists
- searching of literature
- abstracts
- reports
- reference-codes
- classification etc.

Trends in the Development:

The rapid development of the computer as a data-processing apparatus affects more and more the field of Literature-Information. In the above-mentioned 'C-courses' and the 'D-courses' (mentioned below) of the Joint Training Committee the attention paid to the aspects of computer-aided Literature-Searching is increasing.

In order to provide literature-searchers with the elementary information about the use of the computer in their work, plans have been designed to organise a three days' work-shop in which the participants can acquaint themselves with the problems which may occur by changing from the manual to the automated method. They will receive information about:

- elementary computer-technics
- computer-organisation
- computer-systems and 'system-approach'
- programming languages etc.

Professional Education for Librarianship/Documentation:

The Library Academies:

As has been said before, to be accepted to a Library-Academy one has to have completed a school for Higher General Education whereas experience in the field is not imperative. The academies are day-schools.

AMSTERDAM Frederik Muller-Academy:		Assistant-Librarian Library-manager Children's Librarian Music Librarian Documentalist Bookseller-publisher
THE HAGUE Tiele Academy	:	Assistant-Librarian Library-manager Bookseller-publisher Scientific-Librarian
TILBURG	:	Assistant-Librarian Children's Librarian
GRONINGEN	:	Assistant-Librarian Children's Librarian

DEVENTER : an Academy will be opened in 1975

Training (Education)of Users:

> 'The universities do virtually nothing to prepare their students for contemporary innovations in the evaluation and handling of knowledge - a rather striking indictment of education since evaluation and transfer of knowledge and experience is what education is all about in the first place',

said L.M. Branscomb in 'The Management of Information Analysis Centres', American Society for Information Science, Washington, 1972.

If such is the situation in America, it is definitely no better in Holland.

Only here and there in educational programmes in schools and at universities pupils or students are taught how to find and to use information. It will be our task to take the initiative in developing integrated curricula for the training of users from the basic school to the university.

That is also why in the above mentioned 'Cavub Report' recommendations were made in order to improve the situation.

They expect that this goal can be reached by 'educating' students in three aspects:

- in the effective ways to make use of scientific libraries and documentation centres
- in the effective and adequate ways to make use of sources of scientific information
- in the exact ways of designing scientific information.

In order to reach pupils at the various educational levels the most effective and efficient way is to educate future teachers and masters at the different Teacher-Training-Colleges in dealing with information.

General Trend in the Training of Information Specialists:

The need is felt of a possibility to graduate in Information-Science as a post-graduate study in addition to the bachelor's degree or as an independent and separate study for a degree in Information-Science. Fundamental subjects directed towards scientific insight will be the quintessence of this study on university level.

Knowledge of traditional and advanced methods and technics will be imparted to the students; they also will have to become acquainted with the most important institutes where information is produced, processed and used.

It is a matter of course that the elementary knowledge of information-retrieval, -storage, - dissemination etc, and of documentation, bibliography, classification etc. will form the basic part of the study programme.

Aspects such as ethics, privacy, copyright, etc. will be subsequently dealt with, as well as planning and management, statistics, budget and administration. Research will also constitute an important part of the study programme. This will definitely not be an 'Informatica-Training' programme, nor an alternative training-programme for librarians, but education in the whole field of Information.

Training Programmes for Teachers:

At the library-academies students are taught by professionals (in the field of Information) with a sufficient practical and theoretical knowledge. However, they are not trained teachers. Consequently training-programmes or application-courses for future teachers or masters at library-academies and part-time courses will have to be developed. The general idea is to impart the necessary psychological, educational and didactical knowledge in compressed work-shops.

2.6 Poland

Training in library science:

Education in the field of library science on university level in Poland is being carried on by means of intramural studies, and it dates from the second half of the 1940's. These studies previously (till 1969) lasted 5 years, but nowadays their duration has been limited to 4 years. Education on university level in the domain of library science is being carried on now at the following Polish universities:

- the Warsaw University, through the Institute for Library Science and Scientific Information,
- the Adam Mickiewicz University in Poznań, through the Institute for Library Science and Scientific Information,
- the Bolesław Bierut University in Wrocław, through the Institute for Library Science and Scientific Information,
- the Jagiellonian University in Kraków, through the Institute for Library Science and Scientific Information.

Studies of the above kind will also be established at the universities in Katowice and Lublin; moreover, the universities in Poznań and Wrocław are running extra-mural study courses (tuition courses) in this area. All graduates of the above studies are granted the same degree: Master of Library Science.

In the second half of the 1960's at the universities in Poznań, Kraków and Lódź were established inter-faculty study courses in library science, designed for students of all faculties from 3rd and 4th years of studies.

Several years' practice suggests that these studies should be in future changed into post-graduate study courses in library science. Studies in the field of library science will also be established at several Higher Pedagogical Schools in Poland. As early as possible these studies will be organised at such higher schools in Bydgoszcz, Kraków and Olsztyn.

The programme of study is composed of the following groups:
- knowledge of books and libraries, acquisition of books;
- organisation of libraries, techniques of library and bibliographic activities;
- problems of co-operation with readers, assistance to readers.

The programme of teaching includes some general subjects, which comprise the general background of humanistic studies, such as essentials of political sciences, logic, political economy, selected problems of contemporary culture, organisation of science and its developmental trends, foreign languages and certain specialist subjects, such as introduction to knowledge of books and libraries, history of books and libraries, library science, librarianship and bibliography.

At the University of Poznań there are 2-year post-graduate study courses in library science and scientific information, carried on since 1968. There is provision for initiating such studies in library science at universities in Kraków, Wrocław, Lódź, Lublin and Katowice. It has been also planned to establish at certain universities post-graduate courses of specialisation in pedagogical-library subjects.

Warsaw University has introduced, since 1963, in the programme of study courses for librarians, the special subject of study: scientific information and documentation. This programme includes the theory and technique of scientific information, organisation of scientific and technical information, and reprography.

At the present moment fundamental changes are taking place in education at the university level in library science and scientific information. These changes result from developmental tasks set forward and determined by the act of the Cabinet of February 1971 for libraries and specialistic services of scientific, technical and economic information in Poland. This act lays down both development trends of information activity in Poland and main tasks in the domain of education and training of qualified personnel for information service and users' training. Libraries of all types, as well as archives and information centres network, have been included in the nationwide system of scientific, technical and economic information. This resolution of the Cabinet has a direct bearing on the organisation and programmes of teaching in secondary and higher schools.

The programmes of teaching, which are being elaborated now for the purpose of intramural studies at the Institutes of Library Science and Scientific Information, have two main aims:

- specialisation in library science, including subjects introducing generally the problems of scientific information and documentation, providing for specialisation during the 3rd and the 4th years of study, in the field of general (public) librarianship, pedagogical and school librarianship, children's librarianship, history of books, scientific information, publishing and book selling;

- specialisation in scientific librarianship and scientific information.

In the second case, a programme of teaching is provided in the general part (during two first years of study) as well as in the professional part of it, and is directed mainly to the problems of scientific information. This has been expressed by introducing such subjects as mathematics and principles of management and administration (during two first years of study), and the following subjects: knowledge of information systems, indexing and retrieval languages, principles of indexing, programming languages, technical equipment, reprography, etc.; and during the second part of study in special subject: scientific information.

All the above draft programmes are presented in general outline. It has been assumed, in principle, that preparation of specialists for library and information activities is being carried on only at the organisational unit of the university: Institute of Library Science and Scientific Information. At Higher Pedagogical Schools there is only education in the domain of librarianship. As has been exemplified before, the organisational form of studies is different - it varies depending on the type of school. However, studies of intramural character and of 4 years duration predominate.

Training in scientific information:

Preparation of specialists for work in the field of scientific, technical and economic information took place exclusively, till 1972, at training courses organised by former Central Institute for Scientific, Technical and Economic Information, Scientific Documentation and Information Centre of the Polish Academy of Sciences and some other information centres.

Two main types of courses have been shaped so far:

- short-term (2-3 weeks) basic courses,and extra-mural (correspondence) advanced courses (2 years), so called "improving courses", to some extent being a substitute for university studies. This kind of training is being continuously developed in Poland.

The programme of teaching at the advanced ("improving") course, organised at present by the Institute for Scientific, Technical and Economic Information, is composed of the following leading subjects:

information sources,
information elaborations,
indexing languages,
information retrieval,
mechanisation and automation of information processes,
organisation of information activity.

Important tasks, which have been outlined by the Government for the national system of scientific, technical and economic information call for fast and efficient organisation and development of specialists' training to become information workers at information centres and lecturers at Higher and Secondary Schools. These tasks have been set out by the already mentioned Act of the Cabinet, issued in 1971. It provides also for the organisation of post-graduate study courses in the field of scientific, technical and economic information. The first of such post-graduate study courses has been organised within the framework of the Institute for Library Science and Scientific Information at the Warsaw University; it started its teaching activity in the academic year 1972/73.

These studies are extra-mural (evening courses) , and the number of lessons taught is 720 hours. In practice, these studies can be attended by persons living in Warsaw or in the nearest suburbs of the city. The programme of teaching includes the following general subjects: selected problems of logic, cybernetics, mathematics, linguistics, sociology, psychology, didactics, the study of the progress of human knowledge, scientific and technical terminology; and the following specialistic

(technical) subjects: introduction to scientific information, selected problems of library science, sources and means of scientific information, information elaborations and tools of scientific information, indexing languages, selected problems of digital computers, information systems, dissemination and transmission of information, information users, organisation and economic effectiveness of information. The programme includes also individual lectures, delivered on selected specialistic problems (among others: factographic information, methodology of scientific research in the domain of scientific information, translation of scientific and technical publications).

As early as after two years of experience it became evident that it is necessary to make some changes in the above programme of teaching; these corrections tend towards broadening, as well as strengthening of theoretical background for information activity and further enlarging of lectures in the sphere of automation problems, the automation of information processes.

The small and limited territorial range of influence of these evening courses at Post-graduate Study creates the necessity of quickly organising extra-mural study courses.

The Silesian University in Katowice has organised, since the academic year 1971/72, four years intramural studies in the domain of scientific and technical information; within the framework of teaching there are some general-technical and specialistic-technical subjects, corresponding to the types of industrial branches in this region. These studies aim at preparation of specialists for future work at information centres in industry, as information officers, organisers of information and managers of information centres.

In the academic year 1972/73 there have also been initiated 4 years of intramural studies in the field of information at the Engineering College of Wrocław. The programme of teaching provides for preparation of specialists for designing and organising of automated scientific information systems.

According to developmental programmes of the national system of scientific, technical and economic information, there exists the strong necessity of preparation (at higher schools) of the following kinds of specialists:

1. organisers and managers of information centres,
2. information officers,
3. designers of information systems,
4. teachers of information science,
5. scientific-research workers in the field of information.

For the preparation of specialists in the range of points 1, 2 and 4 the most advantageous are post-graduate studies, and for the preparation of specialists of type 3 and 5, 4 years of intramural studies of an adequate programme of teaching.

In respect of the quantity of specialists needed, specialisations 1, 2 and 4 considerably predominate; therefore, the main developmental trends in preparation of specialists to work in the network of information service in Poland have been and will be post-graduate studies of programmes exchangeable according to the needs of the developing national information system.

2.7 Scandinavia

Education for library and information science in Scandinavian countries has been strongly influenced by the American pattern, but universities have been slow to recognise the importance of the subject, and there are very few courses actually at universities. This is partly due to the emphasis on the practical vocational

aspect of the courses, and it is recognised that where a school exists on a university campus, it must reach university standards in academic study, and should also provide facilities for advanced and research work. Only in Finland is there a university School, at Tampere, but there is growing pressure to move courses or begin courses in universities or equivalent institutions of higher learning. The oldest School is the Royal School in Copenhagen, which has existed for 60 years, mainly preparing librarians to work in the public library service. In the universities themselves, the tradition of librarianship has tended to put scholarship first and practical experience as something which can be learnt on the job; this emphasis on subject qualifications is intended to ensure that university librarians should be seen to have equivalent academic status to their other university colleagues. The situation is somewhat similar in the field of information science, where scientific subjects, and especially in computer science, courses or parts of courses have been started on the techniques of information handling and there is the danger of a separation of information studies from the traditional courses in librarianship. Where the course is university based as at Tampere, students can attend the courses given in other departments, and also specialists are invited to give short courses to students of librarianship. Most of the other schools of librarianship have an information studies element in their general courses; some of these are short courses which are compulsory, others are longer and more advanced courses which are offered as options.

In recent years there has been a strong movement for unification, as well as a movement towards the introduction of courses within university institutions. This is largely due to the influence of computer studies, which are now required in all aspects of librarianship, for example the development of the MARC programmes and Universal Bibliographical Control, and also to the recognition of the need for information service in universities and public libraries as well as in special libraries and information centres. More information officers are being appointed in libraries, and there is a growing recognition of the common elements in preparatory training courses. Some years ago difficulties were felt in obtaining a sufficient number of qualified and experienced teachers, in some degree due to inadequate funding and lack of advanced courses which would themselves prepare for teaching in library schools. However, schemes for such advanced postgraduate programmes have been drawn up, e.g. in Denmark and several institutions are already introducing ad hoc courses in research methods, statistics, and other technical aspects of information work. During recent years some institutions e.g. the Danish Library School, has succeeded in developing outstanding and competent faculties by attracting high-level library professionals and graduates from other professions.

2.7.1 Finland

Finland has the only university School at Tampere, and the School of Social Sciences at Helsinki also has recognised courses. Tampere offers degrees in Information Science, ("Informatics") and sandwich courses for specialists with degrees in other subjects are also available, for example for engineers at Helsinki. At Tampere there is a common core course extending over up to 6 terms which is attended by librarians and information scientists aiming at public libraries, university libraries and information centres.

Support by the Ministry of Education the Finnish Association for Documentation has during several years organised a course in information science with a duration of an academic year. Its core has consisted of 220 hourly lectures and exercises which have been organised using the sandwich method of part-time study. A diploma is awarded.

2.7.2 Norway

The Anglo-American influence is strong in Norway, and the courses have a highly practical bias. The Statens Bibliotek Skole in Oslo has for some years offered an optional element in the advanced courses for librarians which includes, as well as basic techniques such as cataloguing and classification, courses in the organisation of information centres, advanced indexing and retrieval systems, computer science and technology, thesaurus design and construction, SDI.

2.7.3 Sweden

There has been, as in Norway, a strongly practical emphasis on the technical aspects of courses, but this now tending to decrease, and more concentration on social aspects such as user group studies, including users of information service.

In 1965 a state commission was appointed to draft proposals on the training of staff for public libraries, school libraries, research and special libraries, and of archivists. On the proposal of the commission Parliament decided to set up a College of Librarianship (Bibliotekshögskolan), in Borås. The old State Library School ceased to exist after the Spring term 1972. The new College of Librarianship which is operating under the auspices of the Department of Education offers a 2 year course for all types of librarians.

Also emerging from the work of the commission is a specific university programme in information science inaugurated in 1971 as a combined programme to be offered by the Royal Institute of Technology and Stockholm University. This one-year programme is generally oriented towards the system analysis and cybernetics approach. Extension of this programme to other Swedish universities is envisaged. It is hoped, however, that a unification of education for library and information studies will be possible.

2.7.4 Denmark

The oldest School in Scandinavia is the Royal School of Librarianship in Copenhagen which offers a 4 year course, oriented towards work in public libraries, and a programme also of 4 years' duration aimed at the career in research and special libraries.

The normal curricula include a special course designed for academic librarians in research libraries who want to qualify in library science. Such students hold recognised academic degrees awarded by universities or institutions of higher education. Plans have been conceived to provide for advanced work at this school, but so far it does not offer academic degrees. The range of subjects comprises themes related to information studies, computer science, library management etc. together with a number of optional courses at a basic as well as at a more advanced level. The School is not associated with a university, though a recent report considers the implication for library education programmes in university settings.

An organisation, Dansk Teknisk Litteraturselskab (The Danish Society for Technical Literature) sponsors an important course aimed at documentalists and information officers in the industry. The Society has offered 4 courses; steps have been taken to revise and reorganise the Society's training scheme.

2.8 Iceland

Iceland offers a picture rather different from most other countries, including the Scandinavian countries, in that although its courses in library and information science are of recent origin, they have been established within the University of Iceland at Reykjavik and as an integral part of the first degree studies. Students may opt for one, or two, or three years of the librarianship courses, three points being 50% of the number required for the first (Bachelor's) degree. There is thus no recognised qualification in librarianship, and although the number of students taking 1 year is probably more than the country could absorb as professional librarians, by no means all of these take three or even two years. The relationship between the professional and non-professional level of qualification is still being discussed. Information science is included as part of courses in special library and information service organisation, and there are also opportunities for students to follow specialist courses in computer studies, as well as occasional lectures and courses from visiting experts from abroad.

2.9 United Kingdom and British Commonwealth

2.9.1 United Kingdom

The pattern of education in the U.K. has differed from that of most other countries in some important aspects. For many years there were only two qualifying bodies, University College London, and the Library Association. The Library Association, like many other non-university professional bodies in the U.K., holds a Royal Charter laying upon it the responsibility for conducting educational courses and examinations leading to a recognised qualification, and for maintaining a Register of Chartered Librarians. Admission to the Register now signifies the passing of the Professional Examination, together with a minimum of three years' practical experience certificated by a supervisor. This qualifies for the award of Associateship of the L.A. (A.L.A). A further qualification, the Fellowship (F.L.A.) may be awarded on acceptance of a thesis, after five years as an Associate. Only the F.L.A., and not the A.L.A., is regarded as equivalent to a graduate qualification, and a somewhat furious controversy broke out in 1974 over the L.A. proposal to insist on an all-graduate professional entry from 1980.

Since these are public examinations, they are open to any member of the L.A., and attendance at courses, though naturally very desirable, is not compulsory, nor do the examinations have to be passed wholly at one sitting. Since the Second World War, the situation has been changing continuously; new Schools have been established in universities and other institutions, the Library Association has adopted a policy of devolving to the Schools the responsibility for examining for its own qualification, and the Council for National Academic Awards includes Library and Information Science in its own range of degree subjects.

Because this pattern has been particularly influential in other countries of the British Commonwealth, it is worth reviewing briefly the course of its development.

The School of Library, Archive and Information Studies at University College London had its origin in courses originally established before the First World War at the London School of Economics, and was formally established at University College in 1919. Until the Second World War it offered a one-year course for university graduates, and a two-year course for non-graduates; both courses led to the University of London Diploma in Librarianship (or Archives). With the post-war development of other Schools open to non-graduates, University College London has confined itself to a graduate entry. It now offers a Diploma as an initial qualification, and a higher degree structure of M.A., M.Sc., M.Phil., and Ph.D.

Library Studies and Information Studies have always been regarded as specialist components of the same range of professional studies; some courses are taken by all students, some are specialist alternative options. Although there is no particular emphasis on any one field, the courses are deliberately academic in their approach, and most of the diplomates choose to work in national and academic libraries. The School is staffed by a small nucleus of full-time teachers headed by a full Professor who is the Director of the School, plus a much larger contingent of part-time lecturers who are practising Librarians, Archivists and Information Specialists.

The University of London Diploma and higher degrees have been recognised by the L A. as conferring exemption from its professional examinations, and leading to Chartered Librarianship on completion of the other necessary conditions. This recognition has not been extended to a newly instituted course in Information Studies, as an optional part of the general B.Sc. awarded by University College on the basis of a selection of courses chosen by a candidate within a range of scientific subjects. Thus a student may study, for example, Mathematics or Geography or Chemistry, (or another specialist choice from the approved range) for two years, and then complete the B.Sc. three-year course by one year's work in Information Studies. When this option was instituted for the combined B.Sc., the School proposed that it should not be regarded as equivalent to the one-year post-graduate diploma course, and this was accepted by the Faculty of Science. Thus the B.Sc. does not carry the award of the diploma, nor exemption from the professional examinations of the L.A.

The Library Association has occupied a unique place on the U.K. professional education scene, but this is characteristic of many other professions, and arised mainly from the fact that until the nineteenth century there were very few universities in the country, and they did not concern themselves very closely with educational programmes specifically directed at professional careers. In the nineteenth century, therefore, were founded many famous Institutions and Associations which, like the Library Association, have conducted courses and examinations outside the universities; amny of these qualifications have received official recognition as being equivalent in academic status to university degrees. The Fellowship of the L.A. is so recognised, and is now accepted by universities as a pre-entry qualification for higher degrees in library and information studies.

For some years the major influence in the Library Association lay in the public library movement, and the syllabus tended to reflect this influence, particularly in its emphasis on public library administration and English literature. This has completely changed since the Second World War; the change was slow but deliberate at first, but has gathered momentum since the introduction of the present syllabus in 1964, and the devolution of responsibility for examining, as well as teaching, to the Schools. This has led to a greater freedom of choice for candidates, since it has very few compulsory subjects and a wide range of options. A Syllabus Review Sub-Committee was set up in 1966 to look at the working of this syllabus, and its report and recommendations were published in the Library Association Record in March 1970. The professional examinations consist of:

(a) (i) the Part I Examination
(ii) the Part II Examination

OR (b) the Post-Graduate Professional Examination. This is open only to graduates with a recognised qualification.

All examinations are open only to members of the Library Association.

The principal focus of the Library Association has always been the non-graduate who enters the profession direct from secondary school, usually at the age of 18/19. These students will normally have passed the General Certificate of Education in at least five subjects, two of which are at the Advanced Level. Other equivalent

examinations are acceptable: some are listed in the Regualtions published in the Library Association Yearbook, some have to be submitted for special consideration by the Library Association Education Committee. The Part I and Part II examinations are based on two years of full-time study, but may also be taken by part-time and private students. Part I must be taken and passed at one sitting, and is a pre-requisite for taking Part II. It consists of four papers:

1. The library and the community.
2. Government and control of libraries.
3. The organisation of knowledge.
4. Bibliographical control and service.

Part II consists of six papers selected from a wide range of options, which may be taken together or separately, and in any order. Papers are selected from three lists, (A, B, C), as follows: one paper, and only one, from List A (library administration); at least three papers from List B (technical services); at least one paper from List C (subject bibliography). Thus the candidate is free to offer the sixth paper from either List B or List C, and may also offer extra papers, in addition to the minimum six, in order to demonstrate a wider range of qualification.

The Syllabus Review Sub-Committee considered the 1964 Syllabus in the light of several factors:

1. The change in emphasis from part-time to full-time study.
2. The introduction of the requirement of at least two G.C.E. passes at Advanced Level, which had changed the average student from the former experienced but less-educated library assistant to a better-educated student with little or no practical experience.
3. The need felt in some Schools for more choice in List B of the syllabus.
4. The very uneven use made of the List C Syllabus.
5. The change in nature of the examinations, especially in List C, as a result of factors 1 and 2 above.

During its discussions, the Sub-Committee received comments and suggestions from Schools, Study Groups comprising teachers, examiners, and students' representatives, and from members of Her Majesty's Inspectorate, who have the duty to inspect and advise on all aspects of education in institutions other than universities. The Report was adopted in 1970 and several changes instituted, mainly to give a wider choice in List B, and a complete change of direction in List C, limiting it to applied bibliography in a narrower choice of more general subjects. The reason for the latter change was that the previous syllabus had been an attempt to build up a very detailed and advanced expertise in specialised fields, and this had proved to be a failure in a two-year course at the immediate post-secondary level.

The three Lists are now as follows:

List A

1 Academic and national libraries.
2 Special libraries and information services.
3 Public (municipal and county) libraries.

List B

11 Indexing (information storage and retrieval) (double paper).
13 Practical indexing (classification and cataloguing).
21 Bibliography (double paper).
22 History of libraries.
31 Presentation and dissemination of information.
32 Library service to young people (double paper).

33 Hospital and welfare library services.
34 Reference and information service.
35 The Promotion of library use.
36 The Library and local history.
37 International and comparative librarianship.
91 Archive administration and records management.
92 Palaeography and diplomatic.

List C The bibliographical organisation of the following subject fields:

101 Language and literature.
201 Historical studies.
203 Geographical studies.
303 Education.
304 Social sciences.
401 Fine arts (excluding Music).
402 Music.
506 Agriculture.
507 Medicine.
508 Science and Technology.

Details of this syllabus, and of others, are to be found in the Students' Handbook published annually by the Library Association.

In previous syllabuses of the Library Association, recognition had been given to university graduates by exempting them from certain parts of the syllabus. The 1964 Syllabus made this difficult, since Part I was preliminary to Part II, and was considered to be a basic "core"; exemption from it would mean that graduates would become qualified without having studied the core of their professional education. After much discussion of this issue, the Library Association decided to devise a completely new syllabus and examination, the Post-Graduate Professional Examination. This is based on one year of full-time study, which must be done at a recognised School. It consists of five compulsory papers and two options; two of the compulsory papers are assessed on the results of course work and the other five have to be taken and passed at one sitting:

Section A. Compulsory Papers

G1. The Library in society (one 3-hour paper)
G2. The Management of libraries (one 3-hour paper)
G3. Classification and cataloguing (one 3-hour paper)
G4. Practical classification and cataloguing (assessed on examined special studies)
G5. Subject bibliography (assessed on examined special studies)

Section B. Optional Papers

G6. Historical bibliography (one 3-hour paper)
G7. History of libraries (one 3-hour paper)
G8. Analytical and descriptive bibliography (one 3-hour paper plus examined special studies ranking for 50% of marks)
G9. Modern book production (one 3-hour paper)
G10. Indexing, abstracting, and information retrieval (one 3-hour paper)
G11. Bibliography and librarianship of children's literature (one 3-hour paper)
G12. Library service for young people (one 3-hour paper)
G13. Archive administration (one 3-hour paper)

G14. Palaeography (one 3-hour paper)
G15. Hospital and welfare library services (one 3-hour paper)
G16. International and comparative librarianship (one 3-hour paper plus examined special studies ranking for 50% of marks)
G17. Library services for science and technology (one 3-hour paper)
G18. Literature and librarianship of local history (one 3-hour paper)
G19. Other papers (see detailed Syllabus).

From January 1976, a new Syllabus will be introduced for "External" students, those who cannot attend a library school and study privately. This is more restricted in the matter of choice of options, and is as follows:

List A. A single paper on the organisation etc. of library services will be set, with alternatives within questions as appropriate to meet the needs of librarians for different types of libraries.

List B.
11 Indexing (double paper).
13 Practical indexing.
21 Bibliography (double paper).
31 Presentation and dissemination of information.
32 Library service to young people (double paper).
33 Hospital and welfare library services.

List C.
107 Bibliographical organisation of the humanities.
304 Bibliographical organisation of the social sciences.
508 Bibliographical organisation of science and technology.

As will be evident, the major emphasis throughout the Library Association examinations has been on the librarianship aspects; information science has been introduced in options as Papers B11 and G10, but without doubt related very directly to those elements of librarianship that can be said to have contributed to its development. These include administration of special libraries, reference librarianship, and subject bibliography, particularly in the natural sciences and technology. It was in these areas that the first major post-war departures from Library Association influence occurred, in the establishment of the university Schools at the University of Sheffield and at the City University in London (formerly the Northamption Polytechnic). The former owed a good deal to the Library Association, but the latter was wholly the result of efforts by the recently established Institute of Information Scientists, which first set up its own series of examinations (or assessment) for the categories of Associate, Member, and Fellow, and subsequently awarded these on the results of the City University examinations, together with an element of practical experience, which varied for each category.

The basic philsosophy of the City University course has been that the information scientist is concerned with "information" and not with an institution (such as a library). He is interested in all aspects of the production, flow and use of information in all its forms; less so with the management of an organisation, since most information services are embedded in a superior organisation such as an industrial firm or a research establishment, and do not exist as separate entities (as do, for example, public libraries). There has been a definite policy to break away from the Library Association tradition of a compulsory course, in "library administration", and instead the introduction of elements not present in Library Association syllabuses, such as the theory of human communication, the application of other scientific studies to information work, and the improvement of performance in foreign languages (since translating technical texts form an important part of some information services).

The syllabus is quoted in full in Part 3 as an example of a theoretically oriented course, and the outline only is given here:

I Information gathering (sources of all kinds)
II Information storage and retrieval
III Dissemination of information
IV Legal and commercial aspects of information work
V Administration and other aspects of information work (including reprography and language studies).

In addition to completing these papers, a thesis has to be submitted for the award of the M.Sc. and Ph.D. There is no course or award in Librarianship at the City University.

Although the course at the University of Sheffield Postgraduate School of Librarianship and Information Science covers similar ground, and leads to either a M.A. in Librarianship or a M.Sc. in Information Science, the philosophy has been one of uniting rather than separating the two approaches. Both degrees are recognised by the Library Association for full exemption from the examinations leading to the Associateship, and the M.Sc. is recognised by the Institute of Information Scientists as exempting from the examinations leading to the qualification of Membership. Like the City University course, this is a full twelve-month course (not the shorter "academic year"), with a series of examinations in May/June, followed by a special study leading to a dissertation presented in September.

Both syllabuses are similar in pattern, and the students attend many lectures together, particularly at the beginning of the course. Like the L.A. Part II, there are three main areas of study:

The library/information service in relation to the community it serves
Sources of information
Technical processes of handling and using resources in relation to the needs of the various types of community.

Although Schur (who teaches at Sheffield) in his survey speaks of "information specialists", the Sheffield M.Sc. is very much oriented towards scientific information - having in mind, like the City course, the particular needs of organisations and communities concerned with science and technology.

Two other U.K. Schools have particular features which single them out from the generality: Queen's University, Belfast, which is unique among universities in offering a two-year diploma course for non-graduates; and the College of Librarianship Wales, which is the only completely autonomous institution in the U.K. to specialise in this field. It offers a variety of courses, for the L.A. Parts I and II examinations, for an Honours degree in Librarianship and a Post-Graduate Diploma, both of the latter being conducted jountly with the University of Wales. As might be expected, Queen's University and the College of Librarianship Wales both offer a local language and literature option, in Irish and Welsh respectively.

All the remaining Schools in the U.K. have similar histories. Beginning in the immediate post-war years as a result of the efforts of the Library Association, they have become progressively more and more independent. Some,like Strathclyde, have grown into universities; some like Leeds, Newcastle, and others, into Polytechnics (which are still governed by Local Education Authorities). Some still enter their students for L.A. examinations, either wholly or in part, usually setting and marking their own examination papers within a general framework approved by the Library Association. Some, like the Polytechnic of North London, have sought other additional qualifications; the Polytechnic of North London enters students for the External Diploma in Librarianship of the University of London. Most, how-

ever, already operate courses for degrees awarded by the Council for National Academic Awards, or are in the process of preparing submissions to the CNAA. These degrees are usually B.A. in Librarianship and B.Sc. in Information Science.

The CNAA was established on the recommendation of the Committee on Higher Education (under the chairmanship of Lord Robbins), as an independent national body with a charter to grant degrees through courses at non-university institutions of post-secondary level. It has established a Librarianship Board which receives and approves submissions of courses for its degrees, which are then the responsibility of the approved institution. Since all of these degrees have been developed in Schools which originally examined for L.A. qualifications, it is not surprising that they often bear the marks of their origin. But many novel approaches are now being explored within the greater freedom which has come with internal examining in place of external. For example, the more traditional courses in cataloguing and classification have developed at the Polytechnic of North London into courses on the Universe of Knowledge, in which the forms and disciplines of knowledge are studied from a theoretical and philosophical standpoint, and on Indexing considered in its widest aspects of the construction and use of retrieval languages, traditional and non-traditional, manual and mechanised.

Thus the trend in the U.K. over recent years has been towards a lessening of emphasis on practical and vocational skills, following courses pursued by part-time study while in employment, and an increase of emphasis on theoretical and academic foundations. In particular, much more attention is now paid to users' approaches and needs, through courses such as "The library and the community"; while in the area of administration, which has for long been something of a bone of contention between librarians and information specialists, more depth study and the introduction of techniques like systems analysis have served to bring out those features which the different organisations, universities, industries, public libraries, have in common in their organisational structures and functions.

2.9.2 British Commonwealth

The British Library Association's examinations are "external", and are open to all who wish to present themselves. An extensive network of examination centres was established in other countries, in particular in the former colonial territories which now make up the British Commonwealth. Students have, even since before the Second World War, prepared by private study or by the A.A.L. correspondence courses, but some institutions established part-time courses, notably with help from the British Council, whose librarians stationed abroad frequently acted as teachers. Scripts were returned to the Library Association for marking, and while no concessions were made in respect of standards of attainment on professional matters, account was taken of the fact that some students were writing in a language which was not their mother tongue.

There can be no doubt that these facilities have made a worthwhile contribution to the development of professional librarianship and information science, but it has been clear for some years that other methods of training were superior, and that these should be encouraged. In June 1973, therefore, the L.A. Council decided that, in view of the considerable and satisfactory growth of full-time Schools in these countries, its facilities for examination centres abroad would be phased out, and withdrawn by the end of 1980.

The general pattern of education in those Commonwealth countries with a developing library service, but no network of local Schools (as there is in India), has been similar, though these countries, as is to be expected, show different levels of growth. In the first place, the tendency was to send suitable candidates to undertake full-time courses of study at Schools in the U.K., and this practice

still continues, particularly at the level of higher degrees, in provision for which the British Schools are still in the lead. Such candidates have been free to undertake any of the options available to U.K. students; some Schools have, in fact, made special provision for courses that would be of particular value to overseas students. University College has for many years offered special courses in Oriental and African bibliography, being able to benefit from close collaboration with the School of Oriental and African Studies of the University of London.

The major drawback to this system is that most students were able to spend only two years in the U.K., and gained the Associateship qualification, which is not recognised as of degree equivalence. A few were awarded additional grants to cover preparation and qualification by Fellowship, which is regarded as of degree equivalence. The value of the extra facility is demonstrated by the fact that the Fellows have usually reached senior positions, even in university libraries where a subject degree would normally be a sine qua non, whereas the Associates have now found themselves somewhat at a disadvantage, not only in competition with Fellows, but even with much younger colleagues with qualifications regarded as superior, such as degrees or post-graduate diplomas in library and information science. Since they may also be serving in districts remote from good study centres, these Associates may also find it unusually difficult to undertake the research necessary to write a Fellowship thesis, and the Library Association is considering alternative means whereby they might capitalise on their often great practical experience to reach Fellowship.

Most students from developing countries of the British Commonwealth have chosen the U.K. for their study abroad; but the contribution of the U.S.A., Canada and Australia, has also been of great value; the U.S.A., in particular, has been offering facilities for advanced work for higher degrees for very much longer than any of the Commonwealth countries.

Although study abroad is a very valuable undertaking, and facilities will always be desirable, through such agencies as Unesco and British Council scholarships, it is not a satisfactory method for producing any country's total requirements of trained personnel, in no matter what discipline. Countries of the British Commonwealth have, one after another, preferred to follow the example of India, Canada, and Australia, and establish their own local Schools of library and information science. Some of these have been awarded grants; for example, Unesco at Makerere College, Uganda, and at the University of the West Indies, Jamaica, and the Carnegie Corporation at the University of Ibadan, Nigeria. Such grants are of course usually awarded on the understanding that the university will assume full responsibility for continuing the School when the grant expires.

The second method, intermediate between total reliance on study abroad and full local validation of courses and qualifications, was for local schools to be established which continued to enter their students for the Library Association examinations. The first all-Caribbean School, located in Trinidad, adopted this course, as did the School opened in Accra by the Ghana Library Board. Both were staffed, in the first instance, by expatriate Britons, Fellows or Associates of the Library Association. The Trinidad School did not survive, but the Ghana School, after a successful start, was transferred from the Ghana Library Board to the University of Ghana, where it continues to play an important role.

Although it was urged by some that one School would suffice for the Anglophone countries of West Africa, two surveys recommended the establishment of new Schools in Nigeria. The first, in 1960, was the Institute of Librarianship of the University of Ibadan, at first within the University Library, and subsequently transferred to the Faculty of Education as the Department of Library Studies. From the beginning, as a university School, it conducted its own examinations, and modelled its courses on what was thought to be the best elements from British and American practice. It has also enlisted the aid of British and American teachers and external examiners,

and was able to recruit good quality graduates, including some science graduates, and to hold courses at an advanced level even in the relatively new ares of information science. Detailed accounts of its objectives, with a core curriculum for basic professional studies, and an outline of research method, are given by John Dean in Appendices to his book.

The second was established at Ahmadu Bello University, Zaria, in 1970, and has so far survived numerous vicissitudes, still relying on expatriate senior teaching staff. It illustrates the problems of providing training for a vast area including a variety of different ethnic groups with a low level of library service apart from a few centres such as the university and the former Northern Region capital city, Kaduna.

Under these circumstances the most pressing need is for a body of well-trained practitioners who can cope with situations that may not be covered in manuals of librarianship and information science, as well as the highly qualified subject specialists who can prepare policies and plans, and hold discussions with Ministers and high-level civil servants and university administrators. Most Schools in developing countries, in Africa and South and Central America, have therefore provided courses at a lower academic level, but with a decidedly practical orientation, for would-be library assistants who do not necessarily aspire either to a university education or to the most senior positions in their chosen careers. Provision for staffing the infrastructure of library and information services is a vital part of a training programme, and is not infrequently discounted or overlooked altogether. It may well be thought that a greater impression will be created by advanced courses in automation, information storage and retrieval by the most up-to-date computers, games theory and management; but for a developing country, with perhaps an infant publishing industry and dire problems of foreign currency, such programmes will not make a powerful contribution to the country's own development in those areas where a good library and information service will count most: in maintaining functional literacy and in supplying specialist information for local needs in industry and agriculture at the appropriate level and in the appropriate form.

The ill-fated original School in Trinidad was, like the Ghana School at first, under the control of a non-university body, in this case the East Caribbean Regional Library Service. Some years later, however, Unesco opened new negotiations with the University of the West Indies, which have resulted in the establishment of a new School, funded by Unesco in the first instance, at the University of the West Indies campus at Mona, Kingston, Jamaica. This School is intended to serve the whole of the Caribbean area, which is possible because the University of the West Indies itself is a regional body with several separate campuses in other islands, as well as Jamaica. The present staff is multi-national, but the University of the West Indies has agreed to assume full responsibility for the School when the Unesco grant ends. The School hopes to offer a three-year course for a Bachelor of Library Science degree, and also to run courses for sub-professional assistants and for non-graduate Associates of the British Library Association who wish to enhance their qualification up to the level of a university degree. Some of the external examiners, as well as some staff, are expatriates. Like the Department of Library Studies in Ibadan, the syllabus has been framed to follow the best examples of American and British practice; it is mainly oriented towards the traditional librarianship subjects of bibliography, cataloguing and classification, technical services, and administration, but the more technical aspects of information studies will also be available in special courses. The first graduates emerge from the School in Summer, 1974.

Much more independence of the U.K. is evident in the former "Dominions", where the local Library Associations and universities have long established their own courses and qualifications. The relative influence of the Association and the

universities has varied: in Australia and New Zealand national recognition has been accorded to the Associateship and Fellowship of the Australian and New Zealand Library Associations, and new syllabuses which include the subjects of Informatics and Communication are being developed in the Schools of Librarianship, especially in the newer Schools that have been established in the State Institutes of Technology. In India and Canada universities have played the major role, but a major role in the development of studies in Information Science has also been played by the Documentation Research and Training Centre of the Indian Statistical Institute, at Bangalore. This was founded by Professor S.R. Ranganathan, who continued to direct the programme until his death. The courses is a post-graduate level, and entrants are also required to have some practical experience. It is a 20-month course, covering subjects related to the new techniques in information processing and library science, including computer science, librametry (mathematics, statistical calculus, and operational research applied to library science and documentation), systems analysis, management science, and pedagogics. Cybernetics is discussed in relation to the control and feedback in an information retrieval system. Logic is discussed in relation to search strategy and the design of cataloguing codes. At the end of the first 12 months, students have to pass an examination in the following subjects:

Classification, theory and practice
Cataloguing, theory and practice
Library Management
Documentation
Statistics
Computer Science.

In the first 10 years of the course, 57 graduates completed the final examination and were awarded the diploma of Associateship in Documentation, accepted as of academic standard equivalent to a Master's degree of a university. The final examination comprises the following subjects:

Introduction to information science
Organisation of information:
  structure and development of subjects
  analysis and classification of subjects
Information systems:
  information services
  planning, organisation and management
  information storage, dissemination and retrieval systems
Research methodology, including a research project
Dissertation.

The syllabus is constantly under review with the objective of including new subjects as the need arises. For example, Management Information Systems has recently been added; this covers the collection of data and information relating to the requirement of management functions at various levels, generating new pertinent data and information surveys from these data, their storage and retrieval. The programme also makes provision for further training, in the form of short-term (2-3 months) advanced training in special fields, refresher seminars in the middle of the year, and an annual seminar.

2.10 United States and Canada

A more accurate assessment of education for library and information science in the United States and Canada will be available when the process of self-evaluation and reaccreditation of library schools has been completed in 1976. The Standards for Accreditation adopted in 1972 set forth five areas (Goals, Curriculum, Faculty, Students, Administration) which the Committee on Accreditation of the American Library

Association evaluates. Programmes of library education are typically attached to a university and the first professional degree, the Master of Library Science (M.L.S.), is a fifth-year graduate programme in higher education, having been preceded by a four-year, undergraduate baccalaureate degree. Entrance to these programmes does not require previous library work. At present the number of library schools accredited by the ALA in the United States is 53 and in Canada, 7. These accredited schools account for approximately one half of the programmes listed in various directories of graduate level institutions offering educational programmes in information science, such as the Unesco and the ASIS directories. However, there is not an accrediting agency for information science. From these directories one may also assess the slow but steady growth of schools offering graduate programmes for library and information science.

The new Standards for Accreditation use the term "librarianship" in its broadest sense as encompassing the relevant concepts of information science and documentation. Also, "libraries" is used to mean the current models of media centres; educational resource centres; information, documentation and referral centres. In the area of curriculum (plan of study) the Standards state that a library school offering a single specialisation may be accredited if it also offers study of the general professional principles and procedures common to all types of libraries and library service. This statement is indicative of the climate for co-ordination of curriculum and instruction in information science in library schools.

At present only approximately one-fifth of the accredited schools use the name, Library and Information Science (or Service or Studies). The remainder generally still use School of Library Science. The most recent name-change has been made at Syracuse University (New York). Effective July 1, 1974, the title, School of Information Studies, will be used. The announcement explained that "the word information studies is simple and direct, and broad enough to cover a variety of concepts, concerns, and activities, including libraries. The library sits in a broad and rich geography of information activities, and we and our students should be a part of that larger community: archives, information retrieval, publishing, museums, cable television, community organisations, regional planning agencies, media centres, etc. The independent information broker is beginning to appear. The information industry will become the fastest growing industry in this country".

Name-change only begins the more difficult detailing of the trends, characteristics, or problems of North American library education. However, one outcome of the very recent years has been a new perception of the role of the professional librarian. A much higher level of expectation of the beginning practitioner has developed. For the veteran practitioner greater competency in services, participation in developmental processes, and evaluation of utilisation procedures have grown in importance. At the same time many new types of materials and techniques have appeared which have crowded the course of study for the student and increased the need for continuing education for the practitioner. However, the improved understanding of the wide scope of information, the deeper roots of communication, and the international aspects of the profession have been tremendously enriching. It is against this background that the library and information science curriculum in the U.S. and Canada should be examined.

Possible avenues open to the student and the practitioner for securing more relevant education for librarianship are: extended time in formal education to gain the desired courses; self-directed, informal study; short courses; or work-experience. None are particularly popular, with the exception of the short course. Relevant to continuing education is the on-going discussion within higher education in the U.S. of the need for the initiation of a new degree below the Doctor of Philosophy level, such as a Doctor of Arts or Master of Philosophy, as an incentive in continuing education. The sixth-year certificate has not been very successful in library science. Also relevant to the overcrowded one-year curriculum of the library school student is the amount of course revision being done in order to add

new information to existing courses rather than the addition of courses. If the various technological advances are reshaping the library, then the traditional courses should reflect these changes. If the library is becoming many-faceted, then the addition of new courses is more understandable. "Generational obsolescense", which occurs when only infrequent and drastic curriculum revision is made, should be avoided. However, all of these types of changes in curriculum have taken place in the United States and Canada in recent years, the past ten years being a period in library education characterised by curriculum revision.

To what extent course revision is being done by individual instructors is extremely difficult to ascertain. The area within the curriculum which is undergoing the most revision in relation to information science is that of cataloguing and classification. The relationship of the area to the curriculum as a whole has changed as well as the number of courses, the content, and the method of teaching. However, the majority of the schools still offer three courses usually in order to cover both cataloguing and classification at the beginning and advanced level. Another course for the organisation of nonprint materials may be offered. The amount of time in the curriculum devoted to cataloguing and classification has declined, a broader spectrum of types of "keys" to material has been introduced, other classification systems than Dewey are considered, the requirement of the courses for every student has been eroded, and open laboratories begun. Not every school has responded to all of these changes, of course. The University of Chicago is rather unique in its coverage of this area of the curriculum in a general course that also deals with reference and selection, the latter generally offered separately. In the specialised courses dealing with the sciences, humanities, and the social sciences, cataloguing and classification seems to be emphasised in the humanities course. Case-Western Reserve University has a course entitled "The Computer in the Humanities", but this cannot be spotted as a trend in any way. The effect of automation on library procedures and the knowledge of indexing gained from information science research are being included in these courses. Integration of new material into old courses is needed, and now that some breakthrough has been made in this area, the way for more integration may have been smoothed.

Information retrieval has not made a great impression on the traditional reference course or on the subject approach to reference. The University of California (Berkeley) lists no courses for the sciences, humanities, and social sciences. Case-Western retains the traditional three. Chicago uses them as a base for covering selection, reference, and cataloguing. Information retrieval has been associated with science, but this is not evident through any change of the traditional course, Literature of the Sciences, except in the use of commercially-produced tools which have been influenced by the computer, such as the key-word indexes.

By far the most consistent practice to accomplish curriculum change has been to add one or two courses, usually data processing (computer oriented) and documentation (science information oriented) to the library school curriculum. A few schools have added a larger number of courses. These schools might best be characterised as those schools also offering the doctoral programme rather than as those schools which have made name-changes although a few schools would fall in both groups. Typical course titles are:

Information Networks (University of Pittsburgh)
Information Systems Administration (University of Indiana)
Library Systems Analysis (University of Maryland)
Construction and Maintenance of Index Languages (Maryland)
Theories of Indexing and Abstracting (Geneseo).

The course offerings in information science have been relatively stable. Where courses have not been offered regularly, the courses seem to have been of an esoteric nature, such as self-organising systems or modeling, or part of a confusion of prerequisite-type courses in a graduate sequence, such as mathematical methods or programming language courses.

The emphasis by information science enthusiasts is in biomedicine, in the library schools and in such schools as the Georgia Institute of Technology. Case-Western Reserve illustrates this type of curriculum, having seven courses available in Health Science Librarianship. The medical uses of the technology have been attributed to their expressing their need, the necessity for speed (unlike law) and an altruistic approach to information (unlike business). Even if a school does not have an approved course of study for Medical Librarianship such as Case-Western, an introductory course dealing with information science will generally use the tools developed for the medical field as examples for students to study.

Some of these courses cover new material which could not fit into a standing course. The introduction into the library schools of new courses dealing with information and computer science has been successful in one way. The emphasis is on "informatics" when the courses are offered in the library schools. One drawback has been an overly-theoretical approach which left the student desiring a more concrete experience with equipment. Another method is to send the student to another department within the university. Courses such as Operations Research or Systems Theory are most often in Schools of Engineering; Information Management and Analysis, in Business and Economics; Linguistics, in Anthropology; and Data Structures, in Information and Computer Science. In higher education in the U.S. reciprocity between graduate schools and between departments within a university permits approximately one-fourth of the library school student's normal one-year programme to be outside the area of library science. However, this freedom is not sufficient to cover more than one area of interest outside the library school. Other areas of interest may be in educational media, psychology, sociology, etc. where the student desires to gain more information about human relations, behavioural patterns, and person-to-person communication technique. The student is often forced to make a choice among several areas of knowledge, all of which are desirable for him. For the student with a good background and a high interest in a related area, the courses outside the library school in any of the areas may give more depth and scope than a similar course adapted to library situations.

Some courses refer to the management or administrative functions of a type of library. American librarianship has typically used four types of libraries - public, academic, special and school - to refer to organisational structures and services. Following a logic that a new type of library would require another administration course the introductory material of the Case-Western Reserve University catalogue, 1970-71, listed the Information Center as the fifth type of library. Later, they revised the introduction, dropping the references to types of libraries. However, Case-Western offers an administration course in Information Centers, as well as for the other types of libraries. Maryland refers to information centres in the course description for Special Libraries. Chicago and California do not refer to any course for the administration of Special Libraries although they continue to offer the traditional courses in the three other types of libraries. Other administration courses have changed to some extent as the statements such as "when you automate" or "if you automate" do appear in the descriptions just as the new media was approached earlier with "when you buy" or "if you buy" films, for example.

The extent of the provision, either through inclusion in traditional courses, new courses, or available courses somewhere under the university umbrella, for information science within the curriculum of any North American library school may be approximated as probably one-third of the student's educational time, available, but not required, and popular.

For the first time the Annual Review of Information Science and Technology, 1973 has devoted a chapter to education for information science. In the chapter Jahoda discusses the new teaching methods and materials. He describes a multi-media approach in lieu of the nine-hour-lecture unit on indexing at the Florida

State University School of Library Science. Teaching materials include a student handbook, a programmed text on search logic, taped lectures with sample indexes to be searched during the lectures on keyword-in-context indexes, and edge-notched-card coordinate indexes. Students are given a demonstration of an on-line computer-searched coordinate index. There are conventional readings in journals and books and discussion sessions with the instructor.

Two sections of the University of Texas Library School's basic reference course were divided into units for self-study. Every respondent considered the self-paced method of instruction superior to the lecture-discussion method.

Slamecka describes a prototype of a new learning system suitable to support the process of self-instruction. The system, called Audiographic Learning Facility, has audio and visual learning materials in randomly addressable "learning units" of various lengths. Only natural language and graphics are used for the writing, recording, structure, and use of the learning material. Active student participation in the development of learning strategy is made possible with this system by simulating interaction with a human tutor. Thus, when a learner is uncertain of whether he has grasped the lesson, he may command the facility in one of three ways: repeat the lesson; illustrate the lesson by example; and present the concept covered at another level of difficulty or from a different viewpoint. The Audiographic Learning Facility was designed and built by the Georgia Institute of Technology School of Information and Computer Science, where it is now in use.

Mignon describes the use of an on-line interactive computer for teaching basic reference service at the School of Librarianship, University of California (Berkeley). The system, called REFSEARCH, includes an index to a collection of reference books and rules for searching the index (the search strategy). Reference questions are translated into the language of the index, and search strategies are selected for locating potentially relevant reference books.

In the information science programme at the University of Alberta described by Heaps and Heyworth, a laboratory is used as an integral part of the training programme. In the laboratory, students perform both manual and computer searches and write computer programmes for preparing keyword-in-context indexes and library acquisition, cataloguing, and circulation records. The laboratory data base is used by students, teachers, and members of the inustrial community, all with real information problems. Students are thus given the opportunity to learn first-hand of user reaction to automation and what the user expects of the information centre.

Borko also gives an example in which students are exposed to problems in a real library situation. The library is used as a laboratory in an information science course offered at the University of California (Los Angeles) School of Library Service. In the course on data processing in the library, students conduct a systems analysis on a library unit of their choosing.

Equipment is available to most library schools, that is, for observation, demonstration, time-sharing, etc. Equipment is often expensive and placed inconveniently, however, for usage by faculty and students. Another fallacy in assuming that equipment is readily available is that the best equipment may not be where the most innovative curriculum design is going on.

The use of equipment for library education can be said to be similar in most library schools to the on-line bibliographic retrieval service available to library school students of the University of Denver. In order to give students practical experience with real searches, the laboratory will offer on-line services to the university community from four data bases: ERIC, including both research report literature and journal articles are indexed in Current Index to Journals in Education; INFORM, a business management data file; CHEMCON, the Chemical Abstracts condensates file; and CAIN, the Cataloguing and Indexing system of the National Agricultural Library.

The quarter of a century since the introduction of the first library school course in documentation may be viewed variously as a short or a long time, but the educational change taking place during that time had little support from the libraries as a whole and the library schools did hasten from other experiences to protect a substantial core of traditional librarianship as essential. However, there is a much better climate for cooperation among all factions than ever before, brought about by the research studies in information science, the evolution and transfer of terminology with which to communicate, and a conscious concern for professional stature.

2.11 Latin America

Most countries of Latin America have had libraries, usually of an academic character, for many years, and nearly all have also established Schools of Librarianship. With only one exception, they provide initial courses up to the level of a first or Bachelor's degree. The exception is the Post-Graduate Course on Information Science for the M.Sc. established by the Instituto Brasileiro do Bibliografía e Documentação (IBBD) in Rio de Janeiro, in agreement with the Universidade Federal.

In some countries, including Brazil, Honduras and Nicaragua, an initiative has been taken by the National Library, primarily, no doubt, with the aim of providing staff for itself. Some courses have been of a lower level than a first degree, and have consisted mainly of an elementary introduction to library techniques, plus a course in Literature so that the assistants would have some grounding in the materials they were most likely to meet. Efforts have been made to raise standards, and to secure University recognition; thus the Federal University of Rio de Janeiro validates both the initial course of the Escola de Biblioteconomia e Documentação, and the M.Sc. course of the IBBD. Well-established initial courses have also existed for some years in universities, in São Paulo, Belo Horizonte, Porto Allegre, Brasilia, Panama, and other cities, and plans are in hand for establishing more advanced courses, including Information Science. A part-time course is planned to begin in São Paulo in 1975.

The IBBD course is the only one of its kind in Latin America, and was originally funded wholly by the Organisation of American States. Its syllabus was largely based on those of Schools in the United States, but from the beginning great attention has also been paid to the theoretical and practical problems of classification and indexing, and both American and English specialists in information storage and retrieval have been invited to give courses. It was considered necessary to import staff in the first years, since Brazil lacked the necessary specialists to teach these courses at the advanced level, but no doubt those who study the course and acquire the appropriate practical experience will thus become qualified to teach the IBBD courses; and since many of the first students were teachers at other Schools, they have since gone on to introduce more information science elements into their own curricula.

The core of the syllabus is as follows:

Information Retrieval Systems
Systems of Classification
Automation in Library Processes
Indexing and Abstracting
Organisation of Specialised Information Centres and Services.

In addition, students must select three options from the following:

Automatic Language Processing
Theory of Communication
Research Methodology
Epistemology
Didactics
Programming
Mathematics.

After success in the course work and examinations, the student must complete a thesis during the subsequent year.

Since 1955, the IBBD has also conducted a one-year part-time initial course on Scientific Documentation, for graduates with a first degree and knowledge of a modern foreign language. The syllabus represents a combination of library subjects such as Reference Service with an introduction to mechanisation and management of information systems. Some of the teachers for this course have taken the new M.Sc. course.

At the Universidad de Buenos Aires, the Departamento de Ciencias de la Información is located in the Faculty of Philosophy and Letters, but the programme contains a strong scientific element in addition to advanced study of traditional subjects such as classification and cataloguing. It includes:

Methods of intellectual work
Media of communication
Classification and cataloguing
General and Special Reference Work
Documentation
Bibliography and Selection of Material
Administration of Libraries and Information Systems
History of the book and of libraries
Introduction to Science and Technology
Comparative Librarianship
Fundamentals of mechanisation
Methods of Research.

As in Brazil, the introduction of information science courses has been regarded as a development of library science, and not as a separate discipline. Thus the emphasis has been on those aspects, of mechanisation for example, which have a bearing on the communication problems arising out of the growth of modern documentation, particularly though not solely, in the fields of science and technology.

Documentation problems have been the subject of active scrutiny in Latin America, mainly through the efforts of the FID Regional Commission for Latin America FID/CLA, which holds regular meetings in the several countries. Unesco has also helped considerably, through the provision of the course recorded at the University of Buenos Aires by Professors Juarroz and Sabor, and through assistance in the establishment of the Escuela Interamericana de Bibliotecología, in the Universidad de Antioquia at Medellín, Colombia. This School, although still relatively small, and in spite of the enormous distances involved, is one of the most popular in Latin America, and is probably the main source of qualified personnel for the Central American States. It was established in 1956 with the aid of a grant from the Rockefeller Foundation, on the initiative of the Dean of the Faculty of Medicine. Medellín was a particualrly suitable place, being also the city of the Colombia-Unesco Pilot Library Project. An international advisory committee was appointed by the Rector, and the School opened at the beginning of 1957. The syllabus combines cultural and professional studies and covers a three-year course leading to a first degree. It has been

influenced, particularly in the third year courses, by the programmes offered by the graduate library schools in the U.S.A. Teaching is in Spanish but instruction in the English language is also given. Seminars and short courses on specific topics are held, and students are encouraged to undertake project work and research. Provision is being made for the submission of theses by successful candidates.

University courses of various levels are also given in Guatemala, at the University of San Carlos, Faculty of Humanities; in Panama, at the University of Panama; in Costa Rica, although there is as yet no School, a course in Special Librarianship is given at the Centro Tropical de Investigación y Enseñanza para Graduados de Turrialba, particularly directed at providing documentalists to work in the area of agricultural research.

The oldest school of Librarianship in Central America dates from 1916, the Escuela Nacional de Bibliotecarios y Archivistas in Mexico City. Established first by the National Library, it is now governed by the Ministry of Education, and provides a two-year course for specialist librarians and a one-year course for a higher degree. The National University in Mexico City also has a School in its Faculty of Philosophy and Letters, with a 4-year course for a first degree: its syllabus includes the usual range of subjects, History of books and libraries, Bibliography, Classification and Cataloguing, Administration and Documentation. It also includes Methods of Research, which is becoming popular in Schools all over the world.

The Latin American countries present a picture of contrasts, with well-established libraries and Schools in many of the largest cities - sixteen Schools in Brazil alone - but also having vast areas which are thinly populated and under-developed, with few or no large cities and considerable problems of illiteracy. In such circumstances it is idle to talk of computers, automation, and other advanced techniques of information science. What is needed, as has long been recognised by Unesco, is the foundation of the necessary library infrastructure based firmly on the real needs of each area, in support of Community Development programmes, in promoting the maintenance of functional literacy after school-leaving, and in providing practical information, easy to use, in aid of the local agricultural, medical, technical workers, at the level which is appropriate to the circumstances.

As in other similar parts of the world, attention needs to be paid to the development of special programmes like the Universidad de Buenos Aires audio-visual course, which could be used on a wide scale to provide introductory courses for practitioners at this level.

2.12 Japan

During the 1972-73 academic year, a total of 62 colleges and universities provided at least 19 semester units of courses in librarianship on the undergraduate level. Of these 62, only 1, Keio University, has been providing a full-time undergraduate programme. It is also the only university that provides a graduate programme of library and information science leading to the Master's degree. Beside these 4-year colleges, a total of 61 junior colleges provided at least 19 semester units of courses in librarianship in the academic year 1972-73. Of these 61 junior colleges, the National Junior College of Library Science provides a full programme of library science.

The School of Library and Information Science at Keio University was opened in the spring of 1951 as the Japan Library School. Its objectives were first to train professional librarians for all types of libraries and to provide opportunities for further training to men and women already employed in libraries, to stimulate and

direct research in librarianship and to become a centre of library science in Japan. At the time of establishment the School was assisted by the American Library Association and staffed by senior American teachers.

In accordance with the plan of development the number of full-time visiting foreign instructors decreased gradually each year until 1956, when the full-time faculty finally came to be composed of Japanese teachers. In addition, however, for the five years beginning April 1957 a Rockefeller Foundation Grant enabled the School to invite an outstanding library expert from abroad to teach, and to send a promising librarian or teacher abroad each year for further study.

In its initial stages the curriculum of the School was similar to that of a typical American library school and it did not change very much for the first ten years. The students at that time were generally junior or senior college students studying for a Bachelor's degree. The curriculum for these years was largely traditional, and only one course, "Informational and bibliographic sources and methods", was directed towards information studies. During the period of the enrichment grant given by the Rockefeller Foundation the content of these courses was improved, especially in the fields of science and technology, as a result of increasing pressure for recruits from research and academic libraries. By the year 1962-63 the information studies area had been strengthened by courses in the literature of the Humanities, the Social Sciences, and Science and Technology, and a course on special resources for special libraries.

In 1962 the School also began a special programme for the training of life-science librarians under a three year grant from the Rockefeller Foundation, which made it possible to invite a distinguished specialist from abroad each year to teach both full-time students and to conduct in-service courses. In the spring of 1967, the School opened a new graduate programme leading to the Master's degree with emphasis on the handling of information; this was the first programme of its kind in Japan and the School decided to re-organise also its undergraduate programme and change its name from the Japan Library School to the School of Library and Information Science.

In 1971, as part of the School's twentieth anniversary programmes, the curricula were again revised to meet increasing academic and social needs, and with the co-operation of American consultants, it has been possible to introduce the new curricula at both undergraduate and graduate levels from the academic year 1972-73.

A substantial element of information science and technology has been introduced into the undergraduate programme, mainly as a series of options, though the compulsory courses include two in information systems and reference and information sources. These give an introduction to the concepts and functions of information systems, and outline methods of systems analysis and design and the role of libraries and information centres. An interesting aspect of one of the Management courses is that it clarifies the significance, objectives and activities of school libraries as educational media centres.

The Master's degree programme includes the following:

Information Science, general
Structure of Information
Information Systems Analysis and Design
Research Methods in Humanities and Social Sciences
Research Methods in Science and Technology
Information Storage and Retrieval
Mechanisation in Information Handling.

In the graduate courses the studies are taken to an advanced level and include courses on methods of research applicable to research in information science and technology, the foundations of information structure in linguistics and logic, and methods of analysing and using information mathematically.

As this is the only university level School of this type in Japan, its graduates are in much demand in library and information services and have obtained posts in organisations of all types: public, university and school libraries, and in special libraries in banks, research institutions, science information centres and other commercial organisations. Of the graduates of the 1973-74 course, 34% obtained posts in government and business libraries, 13% in other special libraries, and 11% in university libraries. Since the establishment of the School a total of 835 students have graduated.

In the future programme in Japan, several institutions are planning to develop their information science courses, though all suffer from a lack of qualified teachers and the necessary financial resources. The School of Library and Information Science at Keio University intends to begin a programme leading to the Doctoral degree in April 1975, and Tokyo University has submitted to the government a plan to commence a graduate programme of library and information science for the training of academic librarians. The National Junior College of Library Science has a plan to develop a four-year college programme in 1977.

2.13 U.S.S.R.

This text was received too late to be included in the evaluation given at the beginning of this Study, and is reproduced unedited in its original form.

THE PRESENT STATE AND FURTHER OUTLOOK OF THE SYSTEM OF PRE-SERVICE AND IN-SERVICE TRAINING FOR INFORMATION WORKERS

V. I. Gorkova, Dr. Tech. Sc.,
Rector of IPKIR (In-Service Training
Institute for Information Workers)

(Summary of a paper submitted to the seminar of senior staff of scientific and technical information institutions, 17 May 1974)

Any improvement in the efficiency of scientific information work and in the functioning of the national scientific and technical information system will depend directly on the standard of training of information workers.

The main objectives with regard to the pre- and in-service training of scientific and technical information (STI) specialists are as follows:

(1) To ensure that specialised STI personnel is sufficiently well qualified to achieve the development goals of the national information system.

(2) To bring an integrated pre- and in-service training system into being in the next few years.

To this end it is essential to know:

the present manpower structure of the national information system and the emergent patterns of change in the system;
data for forecasting development of the system (table of objectives);

the organisational and functional pattern of the pre- and in-service training network;
the present specialised manpower structure of the national STI system is as follows: out of a total of 130,000 specialists some 60 per cent have higher education and 65 per cent of these have been working in STI institutions for over two years; the annual rate of growth between 1969 and 1973 was 3.6 per cent.

During the current five-year plan, the basic organisational structure of the system has been established, particular emphasis will be placed in the future on improving the processes involved. In this connexion, the annual percentage growth in the number of information workers will be maintained and it is expected that the main increase will be in the numbers of graduate staff; the patterns of change in this category show that the annual growth has been 2.1 per cent and may be predicted as not less than 2.5 per cent in the next few years.

Manpower for the national STI system has been recruited from the fields of science and technology; the main responsibility for their retraining and further training has therefore been entrusted to the in-service training network.

On the assumption that all information personnel should improve their qualifications through in-service training every five years, it may be estimated that during the 1974-1975 academic year 21,000 of them will require in-service training and 3,200 graduate specialists from other branches of the economy will require retraining. The through-put of the in-service training network during the 1973-74 academic year is of the order of 14,000 trainees, including 2,000 enrolled in IKPIR.

The existing practice as regards training may be considered from three points of view: level of training, specialisations and syllabus structure.

The training of STI specialists

Specialists with advanced scientific qualifications are trained in the All Union Institute of Scientific and Technical Information (VINITI), where graduates may prepare the (first postgraduate) degree of Candidate in one of three fields: scientific and technical information; computer technology; structural, applied and mathematical linguistics. Up to 1973, seventy-three "Candidates of Technology" had been trained at VINITI.

Higher training in information science may be regarded as consisting of three levels: degree-level training, specialised postgraduate training in STI for scientific workers and specialists, and retraining or in-service training.

Soviet higher education awards degrees and diplomas in the following specialisations related to STI:

mechanisation and automation of data processing and output of information;
librarianship and bibliography;
structural and applied linguistics;
archive science, with special reference to scientific and technological archives;
journalism, with special reference to the drafting of STI publications and literature.

Graduates who take up employment in STI institutions are at present usually employed in narrowly compartmentalised scientific information work. The explanation for this is that they do not receive enough special training in the STI field. A change is at present observable in the curricula of higher-level institutions training specialists in the above-mentioned fields towards a wider range of STI subjects.

There is no form of specialised postgraduate training in STI for scientific workers and specialists in the USSR.

The commonest form of training is the retraining and in-service training of specialised personnel employed in STI institutions,who have higher or specialised secondary education in a speciality other than STI. This retraining is provided by IPKIR and also by means of courses organised by regional-level intersectoral (representing several sectors of the economy) or centrally-located sectoral (one particular sector) STI institutions and by sectoral in-service training institutes.

IPKIR runs specialised in-service training courses in:

(1) the organisation, economics and planning of scientific information work;
(2) document analysis and preparation of information publications;
(3) information and reference services;
(4) mechanisation and automation of information processes;
(5) dissemination of scientific and technical knowledge;
(6) reprography, microfilming and technical facilities for information processes.

The Institute provides daytime (block release) and evening (part-time release) courses; a correspondence course will be opened in October 1974. The full-time course lasts two months, the evening course six months and the correspondence course one year. The Institute has six departments corresponding to the courses enumerated above.

The courses follow syllabuses embracing the main branches of scientific information work and involving 280 hours of instruction. All syllabuses for specialisations involve a number of compulsory subjects: fundamentals of information science and the organisation of scientific information work; principles of establishment and use of a reference and information collection; principles of constructing STI systems and means of mechanising and automating information processes; STI document analysis; theory, practice and technical media for dissemination of scientific and technical knowledge and industrial advertising and organisation and methods. Each of the above compulsory subjects is studied in greater depth as part of the specialised syllabus in which that subject is the principal speciality and students do project work, take tests and exams in it.

Support for the work of the Institute is provided by the leading STI organisations, where the students do their practical work.

The Institute accepts as students specialists from all-union, central sectoral and regional STI institutions, senior staff from information departments (or offices) of enterprises and organisations, who, as a rule, have been through higher education and also teachers of the theory and practice of STI.

In 1973, a total of 1894 students, including 96 from CMEA (Comecom) countries, upgraded their qualifications.

Information personnel also take in-service training courses arranged by information institutions at national level (four courses, central sectoral level (40), republic level (50), and regional level (36). The annual enrolment on these courses is from 10,000 to 12,000 students. Thecourse duration varies between 28 and 160 hours. No prior qualifications are required for students enrolling in the in-service STI training system. Provision is occasionally made for specialised training.

In 1973, the IPKIR teaching staff undertook a research project concerning methods of improving existing in-service training facilities which revealed:

inadequate throughput by individual units of the existing network;
the need for improvements in its organisational and functional structure;
the need for modifications in syllabuses.

As a result, proposals and recommendations with regard to the establishment and in-service training system for STI staff were drawn up and sent to STI institutions for comment.

Behind these proposals was the vital aim of all STI institutions throughout the country, to set up a coherent system of pre- and in-service training for information workers, which would involve:

(1) improving the organisational structure;
(2) improving the functional structure;
(3) co-ordinating the in-service training activities of STI institutions;
(4) improving the training process in accordance with a long-term plan for the development of a national STI system.

The improvements to be made in the organisational structure of the in-service training system involve the creation of branches and of study counselling units attached to IPKIR and the creation of a number of training courses and People's Universities (extramural departments) within STI institutions.

At the present time, IPKIR study counselling units are being established for correspondence students in Leningrad, Kiev and Lyubertsy, work is proceeding on the establishment of Institute branches and the decision has been taken to establish courses in a number of central sectoral STI institutes.

Further training for STI specialists may also be given in People's Universities. Practical experience of STI work in the VINITI People's University has demonstrated that this form of instruction is highly effective; it is recommended that wider use be made of it in the next few years particularly, in national-level STI institutions.

The provision of training for information users is of the greatest importance. Such training is at present provided in many institutions of higher education, by central sectoral institutes in the enterprises and organisations belonging to their sector, and by eight sectoral in-services training institutes and republic-level STI institutes. The courses are designed on the basis of 12-30 hours of instruction. It would be desirable to make STI institutions responsible for providing training for information users, thereby making possible a more efficient use of the facilities of the national STI system. For this purpose, IPKIR has prepared a model syllabus involving 24 hours of instruction.

Improving the functional structure entails distributing students among the different levels of training system in accordance with their qualifications. Senior staff and leading specialists of STI institutions having over two years' work experience are advised to study in IPKIR and its branches; specialists who have worked in the field of STI for under two years and also those in charge of subsidiary STI institutions should take the courses organised by central sectoral, regional and republic-level information institutes.

One highly important aspect of efforts to improve in-service training for information workers is the training of STI teachers. IPKIR plans to undertake this work, providing the training through specialised groups, training attachments and the employment of the teachers in the Institute and its branches. In 1973, only six teachers received training; during the 1974-1975 academic year there are plans not only for courses of instruction but also for training attachments for STI teachers.

Much remains to be done by those responsible for the training of information workers, to publish methodological and teaching material and textbooks on STI. No textbooks on STI specialisations have been produced anywhere in the world and this makes it significantly harder for students to acquire the necessary knowledge. The publication plans of higher education establishments, IPKIR and a number of in-service training courses for the academic year 1974-1975 provide for the publication of collections of lectures on a number of STI subjects and also collections of the basic publications on information science.

In 1973-1974 IPKIR published together the syllabuses of the six specialisations studied in the Institute, and also draft model syllabuses for in-service training courses, which are currently being examined prior to approval.

It is essential to work out unified plans for the preparation of teaching materials and textbooks in order to expedite their publication and to enable the teaching staff in higher education, in IPKIR and in the training courses to concentrate their efforts on the important work of rapidly rectifying the situation.

The creation of a coherent training system for information workers can and must be accomplished through close co-ordination between all STI institutions.

Co-ordination of activities in the in-service training system

The efficiency of the system depends to a great extent on how sophisticated its management system is and how close is the co-operation and co-ordination between the various elements of the system.

The main functions which devolve upon IPKIR in this connexion are:

collection of data concerning the activities of national, centrally-located sectoral and regional information institutions in the in-service training field;
preparation of study and teaching material, formulation of recommendations on the organisation of instruction at the various levels (national, central, sectoral, regional);
organisation of exchanges of experience between various units of the system (institutes, departments, courses, permanent seminars), practical implementation of proposals which have been worked out with a view to developing and improving the system;
provision of advice on methods to national, centrally-located sectoral and regional information institutions on organisation of instruction and on training of STI teachers in various specialisations.

In 1973, the following principles for the co-ordination of the in-service training system were devised by IPKIR:

the statutes of a co-ordinationg council for the system were drawn up, the membership of the council was specified, and a draft co-ordination plan was drawn up for the practical implementation of proposals for improving the system;
the statutes of an IPKIR co-ordination group were drawn up and a work plan prepared;
plans have been drawn up for an exhibit on the training of STI workers as part of the "STI-74" exhibition to be held at the permanent Exhibition of Economic Achievements in Moscow, and work is proceeding on the selection of materials;
a great deal of work is being done on arranging a national conference on "Prospects for the development and improvement of the training system for information workers" and the rules of procedure and agenda have been drawn up;

an analysis has been made of syllabuses and teaching programmes within the in-service training system and model programmes have been drawn up for regional and sectoral STI institutions (which have submitted their comments);
work is being carried out jointly with specialists from the German Democratic Republic on ways of improving the training of information workers in the light of the development of scientific information work, a plan for joint activities has been drawn up, two meetings have been held and an assessment of work accomplished has been prepared;
an analysis has been carried out of the in-service training activities of sectoral STI organs and a report has been prepared;
provision has been made for participation by IPKIR in a one-off operation to collect data on manpower in the national STI system and an analysis of the student cohort in IPKIR is currently in hand.

Further co-ordination of the efforts of specialists of the STI institutions responsible for in-service training will make it possible:

to distribute students rationally between the various units of the system and to keep a check on progress in this field;
to make efficient use of the teaching force available within the system;
to provide high quality textbooks and teaching materials;
to organise the exchange of know-how on the improvement of teaching methods;
to direct the work of improving the system from the centre.

Trends in syllabus improvement

In order to prepare sound proposals for improving the process of instruction in the light of trends in the development of scientific information work, it was necessary to carry out a survey of existing syllabuses.

An analysis was made of 177 syllabuses used at different stages of pre- and in-service training of information workers in various countries selected from published sources of information.

The selection of syllabuses for analysis was made on the basis of qualitative criteria (content). In making the selection the following factors were taken into account:

the specialisation concerned;
the type of material included in the syllabus.

The geographical distribution of syllabuses selected was as follows:

1.	USSR	60
2.	USA	60
3.	Poland	16
4.	Czechoslovakia	12
5.	German Democratic Republic	10
6.	United Kingdom	8
7.	France	6
8.	Federal Republic of Germany	5

Comparative analysis of the syllabuses showed that educational and STI institutions engaged in pre- and in-service training could be divided into four types: scientific information work; data processing; information systems and network; information theory.

This analysis and the comparison of syllabuses for the periods 1965-1970 and 1970-1973 show that there was a steady expansion in the training of specialists capable of using technical facilities for data processing and transfer and of carrying out the complex algorithmic processes in input, processing, retrieval, output and transfer of data using automated systems. It should also be mentioned that the USA now has syllabuses for the training of information theory specialists.

Any improvement in syllabuses epends to a great extent on securing the optimal relationship between subjects. If the quality of instruction is to be maintained in rapidly developing sciences and constantly expanding scientific disciplines it is essential that syllabuses should be regularly brought up to date. The content of recommended subjects, their sub-divisions and the relationship between them are often controversial issues and consequently syllabus preparation becomes extremely difficult. It is greatly simplified if comparative data on the quantitative parameter of syllabuses are available; such data provide clear indications of the most frequently recurring relationships between subjects in syllabuses and make it possible to distinguish the trends of development in the scientific disciplines concerned, taking into account the patterns of change affecting them.

For purposes of quantitative analysis it is essential to select syllabuses at one particular level and in one specialisation.

The syllabuses sometimes contain similar topics and subjects under different names, thereby making it more difficult to trace the dividing line between them. It is therefore essential that, before syllabuses are subjected to quantitative analysis, the designations of the component subjects and topics should be standardised and, in some cases, that a number of sub-topics be grouped together as topics or as subjects, or that the latter be subdivided into their component topics. As a result of this process the proportion of the time spent on each of the topics or subjects is increased or reduced (the total number of hours remaining the same as before). It is recommended that all topics and subjects be listed in the same sequence. On this basis an overall list of topics is drawn up which constitutes a kind of consolidated subject list including all the topics included in the syllabuses in question. This list is corrected (by the elimination of duplication and tightening up the final formulation) and the topics are grouped together into subjects.

The analysis of Soviet and foreign syllabuses which was made on this basis showed that in-service training syllabuses for information workers, both in the USSR and abroad comprised 14 subjects, with variations in the importance accorded to each. Thus, on the basis of the "coefficient of importance" (determined on the basis of the frequency with which the given topic occurred in syllabuses and the number of hours devoted to it) it is clear that in the USSR the main emphasis in the preparation of syllabuses is placed on the following subjects:

(1) the organisation of information work;
(2) sources of information;
(3) reference and information collections and services;
(4) document analysis;
(5) classification and classification systems;
(6) dissemination of scientific and technical knowledge.

Soviet in-service training syllabuses have hitherto failed to follow very closely the modern trend to shift emphasis from the above traditional subject matter to subjects connected with the introduction of data processing technology (chiefly computers). Soviet syllabuses are currently being reconsidered in the light of this trend, which, in IPKIR, is reflected only in the special subject "Mechanisation and automation of information processes" (see table).

The analysis of foreign syllabuses showed that a start had already been made on restructuring even the syllabuses of short in-service courses with a view to including in them a growing range of disciplines connected with the mechanisation and automation of data processing.

In view of the development goals of the national STI system and also of the trends in syllabuses during the 1965-1973 period, it is possible to recommend the following distribution of hours of instruction on in-service training courses (expressed as a percentage, based on an average of the co-efficients of importance of subjects in both Soviet and foreign syllabuses, corrected to reflect the development objectives of the national STI system):

1.	Organisation of information work, national and international STI organisation	18-20%
2.	Sources of information (primary and secondary). Information flows	10-12%
3.	Reference and information collections	10- 8%
4.	Information requirements, requests. Information services	8- 6%
5.	Document analysis	10- 8%
6.	Classification. Classification systems	10- 8%
7.	Dissemination of scientific and technological knowledge	6%
8.	Mechanisation and automation of information processes	18-20%
9.	Theoretical bases of scientific information work	4- 6%
10.	Reprography and rapid reproduction processes	4%
11.	Legal aspects of scientific information work (copyright)	2%

Correlation between subjects in the syllabuses of USSR (in-service training courses (IST) and IPKIR) and of foreigh countries

No.	Name of discipline	Coefficient of importance (%)			Rank order by coeff. of importance		
		USSR (IST)	USSR (IPKIR)	Foreign countries	USSR (IST)	USSR (IPKIR)*	Foreign countries
1.	Organisation of information work	23.4	8.0	4.7	1	4	9
2.	Sources of information	14.2	2.8	7.8	2	11	7
3.	Reference and information collections and services	12.1	12.8	8.2	3	2	6
4.	Document analyses	10.3	5.0	10.6	4	5-9	5
5.	Classification and classification systems	9.2	5.0	11.2	5	5-9	4
6.	Dissemination of scientific and technological knowledge	7.4	5.0	0.2	6	5-9	14
7.	Mechanisation and automation of information processes	5.7	34.3	13.0	7	1	2
8.	Theoretical bases of scientific information work	5.5	4.3	12.2	8	10	3
9.	Information requirements, requests. Information services	5.2	2.1	2.3	9	12	11
10.	Reprography and rapid reproduction processes	3.0	5.0	5.5	10	5-9	8
11.	National and international STI organisations	2.7	0.6	4.1	11	13	10
12.	Information science and its connexions with neighbouring subjects and fields of activity	1.1	9.3	15.6	12	3	1
13.	Information flows	0.8	5.0	1.6	13	4-8	12
14.	Legal questions (copyright)	0.1	-	1.3	14	-	13

(*) Under the special subject "Mechanisation and automation of information processes".

PART 3 Analysis of replies to Questionnaire

This analysis of the completed questionnaire has been made by Mr. J.B. Bukowsky, of the Institute for Scientific, Economic and Technical Information in Warsaw. Since these replies were received at the end of 1972, some of the information may be out-of-date, but an attempt has been made to incorporate as many revisions as possible in the national surveys which have been assembled and edited during 1973/4.

ANALYSIS OF THE QUESTIONNAIRE U/280261 ON TRAINING PROGRAMMES IN THE FIELD OF INFORMATION (DOCUMENTATION) AND LIBRARY SCIENCE ON A UNIVERSITY LEVEL

by J.B. Bukowsky (CIINTE, WARSAW)

1. General remarks

This questionnaire of 16 major questions concerning the organisation, the content and general characteristics of training and education courses in the field of information and library science was sent to 72 teaching institutions in January 1972, and replies in the form of both filled-in questionnaires and/or separate materials (full programmes, lectures, etc.) came in from 58 of these institutions. Some replies were delayed and work on the data was started only when a sufficient number of answers was available to be in some way representative. As the questionnaire was directed to institutions different in organisation and therefore also in programmes, from universities with full academic training to library oriented institutes or courses and others, the questionnaire of necessity had to be of a general nature. This has of course resulted in replies which could not always be assessed in much detail and the general criteria had to be large in scope.

The disparity of the material contained in the returned questionnaires and separate publications has obliged us in this first analysis to report fully the replies concerning questions nrs. 1 + 9 (as a pair), 2 + 7 (as a pair), 4, 5, 6, 8 + 14 (as a pair), 10, 11, 12, 13, 15 + 16 (as a pair) in table form, as these could not easily be summarized in some categories only. Table 4, 6, 12 and 13 are accompanied by summarizing conclusions.

A first scanning of the material received and study of the publications FID 461 (1969), A Guide to the World's Training Facilities in Documentation and Information Work seems to indicate that a substantial evolution is taking place in this area of teaching, in both the content of programmes and the teaching methods used in the most advanced training and education institutions.

Computer-oriented lectures, which were already mentioned in some of the former programmes, now appear in a far greater number than before (although countries in the "Third World" are grappling with lack of finances and are more directly bound up with the country's needs).

In this respect the tendency to link knowledge of the computer with philosophical questions such as the value of knowledge, the psychology of reading, etc., especially evident in some of the more advanced training institutes in North America, is very significant and important. In as far as reprographic techniques are concerned it is interesting to see that these are not so much used as study subjects, but are playing increasingly the role of teaching aids in conveying knowledge to the students. As for teaching methods, the use of the system of seminars is supplementing, and even superseding in a few cases, the former system of lectures; this requires a far more active participation of the students in the course and leads away from the classic class room teaching. In some cases, seminars are organised with a large student body, but individual students are given special responsibility for preparation of the seminar and leadership of the discussion. These seminars may take the place formerly occupied by lectures. In many cases also, as for the method of teaching, mention is made of more extensive practical experience during the course itself, through visiting and studying specialised libraries either in the home country or abroad, during the vacations. Experience in general becomes a more important factor, both for the qualification of the teaching body as for the candidates. The 58 respondents represent the following countries:

- Canada	11
- U.S.A.	13
- Brazil	2
- Argentina	1
- India	4
- Japan	1
- Republic of South Africa	1
- Senegal	1
- Fed. Rep. Germany	1
- Dem. Rep. Germany	1
- Rumania	1
- Poland	1
- Czechoslovakia	2
- Hungary	1
- Belgium	2
- France	1
- Netherlands	1
- United Kingdom	11
- Italy	1
- Spain	1

Canada, U.S.A and U.K. therefore account for more than 60% of the total number of replies, which has certainly influenced in a marked way the general outcome of this questionnaire.

QUESTIONNAIRE U/280261
ON TRAINING PROGRAMMES IN THE FIELD OF INFORMATION (DOCUMENTATION) AND LIBRARY SCIENCE ON A UNIVERSITY LEVEL

A. ORGANIZATIONAL ASPECTS

1. The organizational body responsible for the training is:
   - a university department
   - a separate unit
   - a unit connected with another body or institution

2. The information training takes the form of:
   - a full university course
   - a post-graduate specialization course
   - special, separate seminar courses

3. Duration of the training:
   - up to 2 months
   - from 2-6 months
   - more than 6 months (specify)

4. What is the scientific and/or official qualification of those lecturing?

5. What level is required of candidates for the training:
   - pre-university level
   - university level
   - practical experience in information

6. Do examinations take place:
   - for entry
   -during the training
   - final examinations

7. What degree or diploma is conferred to successful students?

8. How many graduates have finished your training?

9. Are the courses free of charge:
   - for the student
   - for the sponsoring organization or industry

B. CONTENT

10. Structure of the programme:
    - totalnumber of lecture hours
    - total number of practical training hours
    - number of hours on new technology

11. Content of the programme:
    - is it focussed on any specialized branch of science or industry
    - or does it have an interdisciplinary character
    - does it cover subjects related to new techniques in information processes and library science such as computers, mathematics, logics, cybernetics, psychology, sociology, pedagogics
    - how many hours are dedicated to these

12. Do you use modern aid materials? If so, which ones?

13. Do you foresee any future changes in your programme? If so, which ones?

C. GENERAL QUESTIONS

14. Do your graduates generally find employment in the field of information?
    If not, in what other field?

15. Do you (or they) think further training desirable?
    If so, in what form (continuous training, updating courses, etc.)

16. Are you of the opinion that an exchange of experience with other training institutes would be useful?

---

*NB Please do not forget to send us, if possible, any materials, including programmes which might cla fy for us the kind of training your institute provides.

List of respondents to the enquiry

1. School of Library Science
The University of Alberta
Edmonton 7 - Alberta - Canada

2. McGill University
Graduate School of Library Science
3459 McTavish Street,
Montreal 112, Canada

3. University of Western Ontario
School of Library and Information Science
London 72 - Canada

4. Université de Montréal
Ecole de Bibliothéconomie
Montréal - Canada

5.* University of Ottawa
Library School
Ottawa 2 - Canada

6. University of British Columbia
School of Librarianship
Vancouver 8 - British Columbia
Canada

7. Dalhouse University
School of Library Service
Halifax - Nova Scotia - Canada

8. University of Toronto
School of Library Science
140 St. George Street
Toronto 181 - Canada

9. University of Western Ontario
School of Library and Information Science
London 72 - Canada (second return)

10. University of Maryland at
College Park
Maryland 20742 - USA

11. Rutgers University
State University of New Jersey
Graduate School of Library Science
189 College Avenue
New Brunswick - N.J. - U.S.A.

12. University of Dayton
Dayton - Ohio - U.S.A.

13. Florida State University
Information Science and Technology
Tallahasse - Florida 32306, USA

**14. Georgia Institute of Technology
School of Information and Computer Science
Atlanta - Georgia - U.S.A.

15. The Graduate Library School
University of Chicago
Chicago - U.S.A.

16. University of California
Graduate School of Library Science
Los Angeles, California 90024
U.S.A.

17. University of Pittsburgh
Graduate School of Library and Information Sciences
Pittsburgh - U.S.A.

18. Pratt Institute
Graduate School of Library and Information Sciences
Ryesson Street - Brooklyn
New York 11205 - U.S.A.

19. The Ohio State University
Department of Computer Science
Columbus - Ohio - U.S.A.

20. University of Minnesota
Library School
Minneapolis - Minn. - U.S.A.

21. Case Western Reserve University
School of Library Science
Cleveland - Ohio - U.S.A.

22. Drexel University
Graduate School of Library Science
Philadelphia - U.S.A.

---

* Did not fill in questionnaire because of reorganisation.

** Will start in the Fall term of 1972

23. not identified
(University of Strathclyde - Glasgow?)

24. National Science Library
100 Sussex Drive
Ottawa - Canada

25. Loughborough Technical College
School of Librarianship
Radmoor, Loughborough
Great Britain

26. Instituto Brasileiro de Bibliografia e Documentação
Curso de Pos-Graduação (Mestrado) en Ciencia da Informação
(1971/1972) - Brazil

27.* Universidad de Buenos Aires
Facultad de Filosofía y Letras
Dep. de Ciencias de la Información
Buenos Aires - Argentine

28. University of British Columbia
School of Librarianship
Vancouver 8 - British Columbia
(Second return)

29. Newcastle upon Tyne Polytechnic
Department of Librarianship
Post-Graduate Professional Course in Librarianship
Newcastle upon Tyne, Great Britain

30. The Polytechnic of North London
School of Librarianship
London - Great Britain

31. University College
School of Library, Archive and Information Studies
London - Great Britain

32. Liverpool Polytechnic
Dept. of Library and Information Studies
Faculty of Humanities and Social Studies
Liverpool - Great Britain

33. Robert Gordon's Institute of Technology
School of Librarianship
Aberdeen - Great Britain

34. Ealing Technical College
Specialist Centre for Higher Education
London - Great Britain

35. Manchester Polytechnic
Department of Librarianship
Manchester - Great Britain

36. The City University
Centre for Information Science
London - Great Britain

37. Leeds Polytechnic
Faculty of Business and Social Sciences
Dept. of Librarianship
Leeds - Great Britain

38. University of Delhi
Department of Library Science
New Delhi - India

39. Indian Statistical Institute
Documentation, Research and Training Centre
Malleswaram- Bangalore - India

40. Indian Statistical Institute
Division of the above (n° 40)
Calcutta - India

41. INSDOC
Indian National Scientific Documentation Centre
New Delhi - India

42. Universidade de Brasilia
Departamento de Biblioteconomia
Facultade de Estudos Sociais Aplicados
Brasilia - Brazil

43. Zentralstelle für Maschinelle Dokumentation
Frankfurt/Main, German Federal Republic

44. Institutul Central de Documentare Technica
Bucarest - Rumania

45. Institut Supérieur d'Etudes Sociales de l'Etat
Brussels - Belgium

---

* Started September 1972

46. Association Belge de Documentation
1320 Gerval - Belgium

47. Union Française des Organismes
de Documentation
Paris XVI - France

48. School of Library and Information
Science
Faculty of Letters
Keio University
Tokyo - Japan

49. Ecole de Bibliothécaires,
Archivistes et Documentalistes
Institut de l'Université de Dakar
Dakar - Senegal

50. Technische Hochschule
Ilmenau -
German Democratic Republic

51. Kateolra Knihovnictva
Filozfickiej Fakulty Univerzity
Komensketro
Bratislava - Czechoslovakia

52. Faculta Socialuich ved a Publicistiky
Prague - Czechoslovakia

53. Stichting Gemeenschappelijke
Opleiding voor Archief, Bibliotheek,
Documentatie en Informatiebewerking
's-Gravenhage - Netherlands

54. Library Science Department of the
Eötvös Lóránd University
Budapest - Hungary

55. Consiglio Nazionale delle Ricerche
Laboratorio di Studi sulla Ricerca
e sulla Documentazione
Rome - Italy

56. University of Stellenbosch
Department of Librarianship
Stellenbosch - South Africa

57. Escuela de Documentalistos
(Archiveros y Bibliotecarios)
Madrid - Spain

58. University of Warsaw
Post-graduate Study on Information
Science
Warsaw - Poland

Organisational aspects (q. 1 and 9)

		Free	Fees
1.	School of Library Science		x
2.	University Department		x
3.	School in Fac. of Grad. Studies		x
4.	University Department		x
5.	---		
6.	School of Librarianship	--	--
7.	School of Library Service		x
8.	School of Library Science		x
9.	School of L. and Information Sc.		x
10.	University Department		x
11.	University Department		x
12.	University Department	no regular tuition fee for graduate work	
13.	University Department		x
14.	University Department		x
15.	Separate Unit		x
16.	University Department		x
17.	Un. Graduate School of Library and Inf. Science		x
18.	Separate Unit		x
19.	---		
20.	University Department		x
21.	Separate unit - Graduate professional school		x
22.	Professional school		x
23.	University Department		x
24.	University Department	--	--
25.	University Department		x
26.	---	--	--
27.	University Department	x	
28.	University Department		x
29.	Unit connected with other inst.		x
30.	Dept. of Polytechnic		x
31.	University Department	--	--
32.	Unit connected with other inst.		x
33.	Centr. Institution of Polytechnic character: per session UK residents		£ 70
	foreign students		£ 250
34.	Local Education Authority		x
35.	Dept. of Librarianship of Manchester Polytechnic		x
36.	University Department		x
37.	Leeds Polytechnic		x
38.	University Department		x
39.	Unit connected with other inst.	x	
40.	Division of the Indian Statist. Inst.		x
41.	Division of the Council of Scientif. and Industrial Research	x	
42.	University Department	x	
43.	Separate Unit (ZMD)	x	
44.	---	x	
45.	---	--	--
44.	Unit connected with other institution (Central Inst. for Techn. Documentation)	x except for corresp. c.	
45.	Separate unit	x	
46.	Unit connected with other inst.		x
47.	---		
48.	University Department		x

		Free	Fees
49.	University Department	--	--
50.	Unit connected with other inst.	x	
51.	University Department	x full-time + corresp.	x and post-grad. paid by sponsor org.
52.	University Department	--	--
53.	Separate unit set up by 3 large bodies in information		x
54.	University Department		x Students may get scholarship
55.	Unit connected with other inst.		x
56.	University Department		x
57.	---		
58.	Part of University Department	x	

Form of training A. University Courses and degree/diploma conferred (q. 2 and 7)

BLS/BS/BA Degrees N.B. ALL LONGER THAN 6 MONTHS

3 respondents mention courses for these degrees taking 4 years of full-time study in university course
3 respondents mention courses for these degrees taking 3 years of full-time study in university course
1 respondent mentions a duration of 1 year
1 respondent mentions 6 semesters with a minimum of 2025 class hours

MLS/MS/MA Degrees

12 respondents mention a duration of 2 years
7 mention a duration of more than 6 months, up to 1 year
1 mentions a 3-year part-time duration
1 mentions a 1 year + 1 summer duration
1 mentions 1 1/2 years
2 mention a non-specified full university course
1 does not specify how long this course takes

PhD

2 respondents mention a total of 5 years
2 respondents mention a total of 3 years
1 respondent mentions 6 years
2 do not specify average duration

B. Special Courses and diploma/certificate given

Certificate of specialisation	1-2 years
Post-graduate Diploma	not specified
Assistant Librarian	2,5 years
Librarian	4 years
Associateship ALA	8 months
Diploma (unspecified)	1 year
Idem "	2 years (1 day/week)
Associateship Documentation	20 months

Idem	12 months
Brevet de Documentation	1 year
Brevet Supérieur de Documentation	1 year extra
Intensive course (no diploma mentioned)	18-36 hours
Correspondence course - Certificate	1 year
Course of 144 hours, 6 hrs weekly - Certificate	8 months
Special course for the Diploma of Librarian-Documentalist	3 years + 3 months
Special course	2 months
Course for diploma Fachinformator (professional information spec.)	more than 6 months (not specified)
Special part-time seminar course for Diploma as Literature Searcher	13 months - 124 lecture hours
Advanced course for experienced librarians for qualification for leading library functions	14 months - 172 lecture hours
Special course in correspondence form for Certificate (not spec.)	2 semesters (120 hours)
Special courses for Lower Diploma of Librarianship	2 years
Special course - Higher Diploma of Librarianship	1 year

N.B. 1 respondent mentions a post-graduate special correspondence course for a university diploma taking 6 or 4 semesters.
1 respondent announces a forthcoming special course for the Master's Degree for those with professional library or documentation training who have no university degree.
1 respondent mentions the following courses to be in preparation: a course for Part I (Intermediate) and Part II (Final) examinations of the Library Association - 2 years; short courses for practising librarians; a part-time course for qualified teachers leading to a Teacher/Librarian Certificate.

Scientific and/or official qualification of teaching staff (q. 4)

Of the 58 replies, 12 were not sufficiently specific and did not permit categorizing, indicating for example merely "all qualified in various ways" or "all qualifications". These replies have not been taken into account. 10 replies specifically mentioned experience as an important qualification, on itself or in combination with a Bachelor's Degree which was mentioned as basic qualification in 8 replies. The other replies mention PhD in library or information science, MLS or DLS , PhD in librarianship, information science or related subjects, Fellowship of Library Association and Associateship of same. In one case the teaching staff are high school graduates with experience in documentary information activity, and another mentions that the official qualification is : librarian and teacher of the middle school.

It is evident that, except for some cases, the staff is highly qualified and often is part of the regular staff of university professors in those cases in which the information or library sciences are taught within the framework of a university. Besides degrees in information or library science mention is made of degrees in education, psychology, quantitative sciences or engineering and philosophy.

Qualification of teaching body (q.4)

1. Associate Professors; all have undergraduate un. degree + library school degree; several have additional advanced degrees.
2. MLS or DLS and experience as practitioner in librarianship.
3. Master's Degree in library science or inf. sc. or incognate fields.
4. PhD in library or inf. sciences for senior staff; Master's Degree in LS + idem in another discipline.
5. ---
6. Associate Professor; AMLS; AM; PhD; AIA (Ass. Library Ass.); Assistant Professor; MS.
7. BLS; MA in philosophy; MSL.
8. MLS, Assistant Prof., Associate Prof., BLS, BS in library science, MA in inf. science.
9. Assistant Prof., MLS, MA, Professor, PhD in Library Science.
10. MA and above.
11. Graduate professorial degree (most in library service) or Bachelor's Degree with considerable experience in libraries. Many faculty members also possess a doctoral degree.
12. At least MS; many PhD; must have experience in industry.
13. Degrees, experience.
14. PhD in quantitative science or engineering.
15. Faculty
16. PhD in librarianship, information science or related subjects.
17. Professional degree; PhD preferred. Experience in field of librarianship.
18. MLS degree or other appropriated advanced degree.
19. ---
20. MA or PhD in library science or higher education.
21. Faculty of the School of Library Science.
22. Full-time faculty of 14: 10 with doctorates in library science, information science, education and psychology; 4 have professional MS degrees.
23. BA - 6; BSc - 2; MA - 1; PhD - 4; MLS - 6; BLS - 2; lecturers: 8.
24. Master's Degree; PhD.
25. At least a Bachelor's Degree and Fellowship of the Library Association.
26. ---
27. Bachelor's Degree, Professors, Librarians.
28. Academic qualifications,degrees in librarianship, several years of experience in the field.
29. Mainly FLA (Fellowship Library Association) and/or university degree.
30. Almost all are professionally qualified librarians. 70% are graduates, 30% have higher degrees.
31. All.
32. Final Professional qualifications of the Library Association + first and higher degrees.
33. Qualifications of the Library Association of Great Britain, Associateship and Fellowship.
34. Degrees, diplomas in education, professional qualifications.
35. All staff members of Department are qualified teachers.
36. Science graduates with information work experience; some with MSc in Information Science.
37. There 29 staff, all qualified in various ways.
38. Master's Degree in Library Science, in addition to the basic Bachelor's, Master's degrees in an academic discipline.
39. MA, LT, FLA, DLit., BSc, Dip. Lib. Sc., MA (Libr. Sc.), BSc, BA, Cert. Lib. Sc., B Lib. Sc., Dip. Comp. Science.
40. Post-graduate degree in Library Science/Documentation with experience in research in documentation.

41. Degree in a subject with professional qualification in Library Science and Documentation. Lecturers hold senior positions in the organisation.
42. Official qualification of the faculty members is the Bachelor's Degree in Library Science.
43. Scientific level.
44. Lecturers are high school graduates with experience in documentary information activity.
45. Enseignement Supérieur de l'Etat (State Higher Education level).
46. ---
47. ---
48. Qualifications recognized as university level by standards of the Japan University Accreditory Association.
49. ---
50. Advanced studies in information and documentation science.
51. Lecturers are regular members of the faculty. They have academic degrees of Doctor of Philosophy.
52. Senior lecturer, Lecturer.
53. 30 specialists,part of whom have a scientific degree and others have a long time experience in the subject dealt with. For second course mainly skilled librarians.
54. Official qualification: librarian and teacher of the middle school.
55. University professors.
56. Professor; BA + Hon.+ MA + PhD; Lecturers: BA + Hon. Diploma.
57. Members of the Faculty of Archivists, Librarians and Archeologists.
58. PhD, engineers, MS with experience in information work.

Level required of candidates for the training (q. 5)

15 out of the 58 respondent institutions provide courses with entry for students at a pre-university level. 5 did not mention what kind of general level is required or specify whether or not experience alone would suffice to be accepted. 9 accept the GCE as a basis, generally a 5 subject GCE including English language and 2 subjects at A-level for regular full-time university education as well as (in 1 case) for correspondence courses (requiring an additional experience of 2 years in librarianship or information). 1 respondent accepts matriculation, school leaving certificate or Senior certificate for its Lower Diploma and matriculation for the BA degree in Librarianship, and 1 mentions qualification acceptable to the Library Association.

In all other cases a Bachelor's degree is required for entrance in courses leading up to MLS and MLS is required for reaching PhD and for all specialising post-graduate courses, as well as for Msc. 10 of these mention experience as a second requirement, 2 mention it as desirable - this experience should in general be of two years either in information activity or in libraries.

We can therefore say that, in general terms, university courses leading up to MLS, PhD, Post-Graduate Diploma or Master's Degree, requirements are BA or BS and a good Honors Degree, whereas new entrants in the university have to fulfill the same requirements as students of other faculties or institutes. It is important to note that 12 institutions mention experience as an important factor, in 1 case even an experience of a duration of 3 years in library work after the first degrees taken. In only a few cases (5) one additional language is mentioned as a condition; this may be due to the fact that relatively few European universities or institutions responded to the enquiry (4 Canadian and 1 English university).

Examinations (q. 6)

Entry Examinations

19 respondents mention some kind of entry exam or interview. In 1 case this exam takes place after a 4-week orientation programme; in 1 case also applicants are required to take the Graduate Record Examination given by an Educational Testing Service. 3 mention a selection interview, 1 mentions educational tests and 1 an Admission Test for admisstion to MLISc. 2 mention normal examinations as required. The other 10 respondents indicate no special test or examination but mention entry exam as required.

Examinations during course

38 mention that such exams take place. 32 respondents give no specification on the form or content of such examinations whereas 1 mentions weekly assignments as form of the exam, and 1 mentions internal tests during the courses (without specifying the incidence of these), and 1 mentions exams for BLSc and MLISc also without specifying how often they take place. 1 respondent specifies that for the Post-graduate course a mid-sessional examination takes place half-way through the course; for BA an exam at the end of 1 year and a mid-sessional exam each summer for the 2-year course, for a Diploma at the end of each academic year. 2 mention exams at the end of semesters, 1 mentions exams in the form of seminars and papers on different subjects.

Final exams

42 out of the 58 respondents mention some kind of final examination, 3 of which say it may be replaced by research work (1) or take the form of a written Report or Thesis (2). 2 mention the PhD as final examination. In 1 case the exam is an external examination of the Library Association of Great Britain and 1 such final examination is a recognized State examination. 3 specifically mention there is no final examination of any kind, the remaining 13 not having replied to this specific question. 2 of those institutions declaring to have no final examinations do however have exams during the course, without specifying the frequency or subject.

Examinations (q. 6)

respondent	entry exam.	during the training	final examination
1.	after 4-week orient.	x	x
2.	no	x	no
3.	---	weekly assignments	---
4.	no	x	may be replaced by research work
5.	for. stud.: English	---	---
6.	---	---	---
7.	for. stud.: English	---	---
8.	idem	---	---
9.	idem	---	---
10.	x	---	for each course
11.	Graduate Record Exam.	some	no
12.	---	x	x
13.	---	x	x
14.	---	x	PhD
15.	x	x	x
16.	---	x	x
17.	---	x	for Advanced Cert. + PhD
18.	---	x	x
19.	---	---	---
20.	---	x	x

respondent	entry exam.	during the training	final examination
21.	---	---	x and/or completion by paper or project
22.	---	---	x at end of courses. No final compreh. ex.
23.	---	---	x
24.	---	x	x
25.	---	---	At the end each acad. y.
26.	---	---	---
27.	x	x	x
28.	---	x	x
29.	---	x	x
30.	selection interview	x	x
31.	---	---	x
32.	some educational tests	x	x
33.	pre-entry exam. necessary	x	external exam. of the Library Ass. Gr. Brit.
34.	selection interview	x	x
35.	---	x	at the end of courses (1,2 and 3 years)
36.	---	each acad. year	for MSc + Report/Thesis
37.	---	x	x
38.	adm. test to MLISc	for BLSc + MLISc	x
39.	x	x	x
40.	x	x	x
41.	---	assessment pract. work	x
42.	x	x	x

respondent	entry exam.	during the training	final examination
43.	---	---	--- no off. degree
44.	---	seminars + papers	x
45.	---	x	x
46.	---	x	x
47.	---	---	---
48.	x	x	x
49.	---	x	---
50.	x	x	x
51.	x	x	x
52.	x	x	x
53.	---	---	---
54.	for full univ. course	at end of semester	State examination
55.	no	no	no
56.	---	x	x
57.	---	---	x
58.	selection interview	at end of semester	Report or Thesis

Employment of students after finishing the course (total numbers unless otherwise stated) (q. 8 + 14)

		Nr. of graduates	Employed in
1.	1969-1972	184	libraries of all sorts
2.		1268	in information centres
3.	1967-1971	500	libraries, book-publishing, teaching
4.		450	not specified
6.	enrolled 63	---	as librarians
7.	enrolled 50	---	cataloguing, acquisition of doc. and financial inf., techn. processing of libr. material, circulation and storage of libr. mat., management of libraries
8.	enrolled 300 10-20 specialising in information science	---	planning and implementing systems design concepts; automation proj.
9.		---	as librarians
10.		± 60 per semester	in information centres
11.	500 enrolled in cont. educ. courses	2232 MLS 32 PhD	---
12.		8	information science
13.		1700	in information centres
14.		250 (MS and PhD so far)	inform./computer system design specialists in industry
15.		---	in information centres
16.	per year	± 15	in information centres and libraries
17.	 + predecessors	± 1700 ± 1600	library/information centres science field, also teaching of LS
18.		over 3000	in information centres
19.	graduates undergraduates	300 550	---
20.	per calendar year	80-100	in information centres
21.		---	information centres and libraries
22.	per year total	180 ± 2800	publ. libr. : 25% acad. libr. : 30% school libr. : 30% spec. libr. and inf. centres : 15%
23.		59	in information centres

24.	520 enrolled	26		---
25.	1971/1972 1971/1972	38 43	BA postgrad.	libr. or inf. work minority; teaching, educ. work, publishing
26.	---	---		---
27.		80		in information centres
28.	3 enrolled in 2-y. programme	750	BLS	---
29.		130		in information centres and libraries
30.	since 1946	±5000		in informat[illegible] centres
31.	enrolled in starting course 1 stud. MS 7 stud. PhD	6	BSc	---
32.	500 start oct. 72 - postgr. 200			---
33.	1967-1972	+200		in information centres
34.	per year	120		in information centres
35.	per year	185		---
36.	enrolled MSc per year 30 Diploma 20			---
37.	since 1946 ±	1500		in information centres
38.		---		in inform. and libr. sc.
39.	1962-1971	57		in information centres
40.		50		in information centres
41.		88		in information centres
42.	1966-1972	93		generally as librarians some in spec. libraries where inf. work is done
43.	first training courses finishes end 1972	---		---
44.		±1000		majority in inform.centres; some are information users in various fields
45.	period of 5 years	+100		in information centres
46.		---		---
47.		---		---
48.	undergr. progr. since 1952 postgr. progr. since 1968	888 18		in information centres in information centres
49.		---		librarians, archivists and documentalists
50.	programmes start in 1972: ± 450 stud. for Fachinformator	---		---
51.	full-time ed. corr. course post-graduates	160 140 30		--- --- ---

52.		487	in information centres
53.	since 1951	±280	----------
54.	1950-1970		libraries and inform. centres; some in other cult. institit. (middle school, cult. houses, tv, etc.)
	full univ. course	520	
	idem by corresp.	280	
	postgr. studies	73	
	separate courses	102	
55.	per year ±	20	usually they are already in this field
56.		---	in information centres
57.		76	in information centres
58.	course started autumn 1972 - enrolled 33	---	usually already employed in information

Structure of the programme (q. 10)

Resp.	Total hrs. lectures	Total pract. training hours	Hours on new technology
1.	15 hrs/week per sem.	Prior to entrance	3/semester on automation + libraries but technology is present in all the courses
2.	51 credit hrs (1 cr. hr = 3 h/week for 13 weeks)	Incl. in total, in form of practical assignments	Impossible to estimate: new developments and methods covered in every course
3.	Between 1/5 and 1/4 of total year's programme devoted to inf. science		
6.	2-years programme req. 30 units of course work (entrants with bach.degree) 24 units (with relevant post-gr. work in other dept.); 15 units (with 5th year BLS)		
10.	36 hrs. to complete the programme		
11.	36 credits for MLS. Each course carries 3 credits and meets for 2,5 hrs. for 14 weeks	Progr. concentrated on school libr. serv.:150 hors. exp. in school library. Others in public or spec. library	Dependent on course
12.	39 hrs. + thesis		
13.	170 (quarter hours = 3 q. h. = 2 sem. hours)		21
14.	-min. n°.credit hours BS: 193; MS: 50; PhD:no limit		
16.	60 directly in inf. sc.		
17.	108 (36 credits) MLS	only required in School Library Certification Programme: 1-3 hrs.	
20.	54 quarter hours for graduation		

21.	36 semester credit hrs.		
22.	60 q.hr. credits, usually in the form of 15 courses of 4 cr. each. A course meets 1/week for 11 weeks during an academic quarter.		
23.	1000 hours	150 hours	50 hours
25.	12-20 hr./week	5-week periods at the end of each academic year	2-6 hours
27.	Ass.Libr.: 300 Libr.: 1500 Bach.: 1740 +thesis	300 1500 1740	) up till 600
28.	780	80	40 required + many others in elected advanced courses if selected
29.	567	150	10
30.	± 260 per year	varies from 3 weeks - 2 months	± 40 per year
31.	not known	not known	not known
32.	± 15 per week	4 weeks per year	1 per week (minimum)
33.	± 20 per week	± 40 per week	± 2 per week
34.	18 hours per week	6 hours per week	1 hour per week
35.	Post-gr. course: 612 h BA - 1 year : 510 h BA - 2 year : 540 h 2-year course : 560 h		
36.	MSc ± 203 Diploma ± 250/220	± 740 (incl. Report or Thesis)	
37.	± 800 lecture h/seminar practical h per year		

38.	BLSc : 390 h MLISc : 420 h	180 h 60 h	
39.	984 hours	861 hours	150 hours
40.	864 hours	864 hours	36 hours
41.	2h/week for each subj.	no	no
42.	1825 hours	200 hours	90 hours
43.	± 600 hours	± 300 hours	
44.	407 hours	125 hours	120 hours
45.	1980	1568	traineeships
48.	Undergr.min. 860 h (3 y) Postgr. min. 480 h (2 y)	± 200 h or 20% of total	± 120 h
49.	334 (I y.) - 352 (II y.)		
50.	1543	1040	52
51.	12 h/week libr.+inf. sc. 12 h/week in cognate field (soc.,English,German)	2-6 h/week; 1 month field practice library or inform. centre each year	4 hours/week
52.	171	126	6
53.	124 and 172 resp.		
54.	648 hours in correspondence form: 198	360 h + 200 summer practice in libraries 162	± 35% of total hours ± 30% of total hours
55.	30 hours in total		
56.	12 hours/week - 30 weeks y.	8 hours/week - 30 weeks.y.	1/2 hour/week - 30 weeks y.
57.	900 hours total		
58.	9 hours/week 2 years	not yet	

99

Content of the programme (q. 11)

Resp.	Science or ind. branch oriented	Interdisciplinary	New techniques / hours
1.	All types of libraries are covered	courses may be taken outside school	computers/-
2.		yes	varies according to courses selected by individual students
3.	no	yes	difficult to assess
6.			intr. to automation (computer and related equipment); electronic indexing and retrieval methods
7.			dev. of methods for inf. processing; data processing; inf. retrieval techn.
8.			feasibility research, model simulation, inf. management, planning + control techniques, critical path methods (not offered 1971/72)
9.			introd. concepts in computer sc. and system analysis; file organiz.; search strategies; measuring effectiveness of an IRS
10.	yes (not specified)	yes	computers, mathematics, logic, cybernetics, psychology, sociology, paedagogics
11.			computer based IS and Laboratory, micro-forms, systems analysis
12.		yes	
13.		yes	computer, sociology (9 hours)
14.		yes	all
15.			computer, graph theory; children's + young people's literature studies
16.			varies, ± 16 hours
17.			varies with course selected
20.		yes	in related fields (course work taken in other departments)

89

18.			computer and other technol. advance; a/v methods in libraries
21.		yes	yes (not specified)
22.			general librarianship, inf. sc., educational media, new techn. of inf. processing
23.	no	yes	150 hours
25.		yes	computer science, sociology, economics, chemical engineering, human biology, Russian, reprod. studies. Probably 1974: courses in calculation Hours: 6-8/week, to be considerably increased under revision.
27.		yes	
29.	no	no	computer applications are dealt with where appropriate (e.g. cataloguing, indexing, management)
30.	no	yes	varies with course
31.		no	yes, number of hours not known (not spec.)
32.	no	yes	2/5 of the courses approx. (not specified)
34.	students can choose from many special branches	yes	yes (not specified)
35.		yes	
36.		yes	computers , mathematics, logic, psychology, statistics - ± 30 hours
37.			computer, management sc.
38.	no	yes	yes (not specified)
39.	in general:no but part. are req. to spec. in a branch of science or industry for theory + practice of reference serv. compiling documentation lists + trend-of-research reports	yes	computer science, librametry (mathematics, stat calculus, operations research) system analysis, management science, pedagogics. Cybernetics in relation to control + feedback in inf. retrieval system. Logic in rel. to search strategy and design of cataloguing code. 150 hours

40.	no	no	yes (not specified)
41.	no	no	computer in libr. + documentation science
42.	no	yes	mechanization + automation of libraries is obligatory course: 60 h. Mathematics, logic, digital techniques etc. are electives
43.	no	yes	specialised in automatic indexing and retrieval
44.		yes	120 hours (not specified)
45.	no	yes	
48.		yes	more than 200 hours (not specified)
49.		yes	no
50.	2 of 3 courses specialised for science and industry	yes	computers, mathematics, cybernetics, new techniques in information process; about 50% of all lectures
51.	the post-graduate programmes are specialised in this sense	the 5 y. programme yes	
52.		yes	
54.			new techniques in information process + library science: ± 50% of total programme
56.	no	yes	yes, but only as introductory matter
57.		yes	
58.	no	yes	mathematics, logic, philosophy, computers

Use of modern aids (q. 12)

Of the 58 respondents 47 replied to this specific question regarding the use of modern aid materials. 5 of these reply that no such materials are used. In 1 case (nr. 27) the lack of sufficient modern aids is due to economic limits, although the teachers are conscious of the need of introducing more modern aids. 16 respondents - all Canadian, American and Japanese institutions - use computer facilities, in most cases belonging to the training institute, although there are also cases in which students have access to remote terminals and random use. These facilities are, in particular :

a. IBM 360/67 (1)
b. Control Data System (1)
c. IBM 360/65 (2)
d. IBM 1130)
e. IBM 360 (not specified)) - (1)
f. PDP-10 (on-line time-sharing))
g. IBM 1620 + Philco 2000 (1)
h. PDP-8)- (1)
IBM-1130)

In other cases the type of computer has not been specified. Respondents then only mention students' access to such facilities. A more detailed study of the programmes attached to the questionnaire indicating the lectures given, allows us to draw some general conclusions as to the specific use that is made of computer facilities. From "Introduction to Data Processing", "Library Application of Data Processing", "Problems in the Computer Control of Information", "Data Processing and the Library" show us that the computer is not only a study object for the students but that it is also used by them to acquire knowledge.

Films and film strips are mentioned by 12 respondents, audio visual means by 9 respondents, punched cards by 4. Reprotechniques are used only as instruments to handle documents and not as teaching aids. In total 21 respondents mention technical aids other than computers.

If we add the 5 negative answers to the 11 who have not replied, we arrive at the conclusion that a relatively large number of training institutes do not use modern aid materials (16 out of 58). It is interesting to see that in 1 case a Media Lab is mentioned as support for the instructional programme.

Re: Use of modern aid materials (q. 12)

1. Films - filmstrips - records - overhead projectors
2. Intr. to data processing: modular self-instructional package of a/v presentations - programmed instruction and practical exp. of visiting and running computer programmes.
   Library appl. of data proc.: integrated model of different IR systems all with same data base - used for demonstration, manipulation, comparative evaluation of systems and of research facilities.
   Systems analysis: self-instructional packages - seminar discussion - field work in which teams of students under tutorial supervision act as consultants to local libraries.
3. A/v materials - computers - etc.
4. ---
5. ---
6. Remote terminal access to University's Duplex IBM 360/67 with peripheral equipment; direct access to unit recorded
7. Control Data System with 49K of 60-bit words.
8. At the Computer Centre: IBM 360/65; within the School: IBM 026 keypunch, 083 sorter, 087 collator, 407 electronic acc. machine and 870 document writing system with upper and lower case set.
9. IBM 1130; IBM 360; PDP-10 (on-line time-sharing).
10. Modern aid materials are used (not specified).
11. Many a/v materials; 3 computer terminals for student use.
12. Overhead projectors; students are expected to use the computer (sic).
13. Films, TV, others.
14. Self-instructional system "Audiographic learning facility".
15. IBM 360-65.
16. Films - computers for information retrieval and statistics.
17. A/v aids incl. closed-circuit TV - computer and data processing machinery (not specified).
18. Films - slides - transparancies - tapes - records - computers. Introduction and use of time-saving, error-reducing mechanical and electronic devices. IBM 1620 with random access storage and two large-scale Philco 2000's
19. with multiple tape drives. PDP 8 computer and IBM 1130 with random disk storage + variety of unit equipment.
20. Transparancies - films - filmstrips.
21. Modern aid materials are used (not specified).
22. Media Lab.: this laboratory has equipment for recording + proj. a/v material.
23. Minoforms - computers - punched cards - magnetic tape - typewriters - records - teach. machines.
24. ---
25. Film - filmstrips - slides - transparancies - micro tapes.
26. ---
27. Slides - projectors - etc. Other materials and aids are studied during visits to other inst. Professors are conscious of need of other modern materials - lack of funds.
28. All a/v aids, access to computer terminal.
29. Overhead projectors - slides - magnetic tapes - record players.
30. A/v materials

93

31. Computer.
32. Computers - teaching aids.
33. Overhead projectors - filmstrip projectors - slide projectors - movie projectors - photocopies - printing presses - grammophone record players - tape recorders.
34. All a/v aids.
35. Films - filmstrips - slides - tape recordings.
36. Films - overhead projector.
37. Modern aids are used (not specified).
38. No modern aids are used.
39. A/v materials - audio tapes - charts - tables - graphs - slides - tape recorder - epidiascope episcope.
40. A/v aids.
41. A/v aids.
42. Slides - transparancies for overhead projection.
43. No modern aids are used.
44. Charts - documentary films - slides.
45. No modern aids are used.
46. ---
47. ---
48. A/v materials - microfilms - reader-printer - punch cards - tapes - computer systems of the University's computer are available.
49. ---
50. Manual and machine-punched cards - microfilms.
51. Slides - films - tapes.
52. No modern aids are used.
53. ---
54. Frame projector - microfilm reader - hand selector for punched cards.
55. No modern aids are used.
56. Films - transparancies - slides.
57. ---
58. Tape-recorder - epidiascope.

Changes foreseen in the programme (q. 13)

19 out of the 58 respondents did not reply to this particular question (including those who only sent materials not mentioning any changes foreseen for the future). Of these 39 answers, 3 state that no changes are foreseen, whereas 7 mention that changes are under discussion or are continuously applied, without specifying their nature. 1 of these indicates that lack of funds is mostly responsible for stagnation. 2 answers came from institutions which have just started a new programme and do therefore not foresee changes in the immediate future. All respondents, however, emphasize that, apart from major modifications, programmes are under continuous review and try to keep up by including new aspects. Specifically mentioned changes fall into two categories: (1) the form of the training and (2) its content.

(1) Form of training

These modifications concern in the majority of the cases the introduction of new or higher levels of degree (MA, MS, PhD), the recognition (and 1 case) of the BA degree as an Honours Degree, and the introduction (also in 1 case) of a Lower and a Higher Diploma of School Librarianship. In 1 case, work in smaller group seminars is mentioned as well as more individual work. In 2 cases a new model of training is foreseen for the year 1975; unfortunately no indication is given as to the orientation of such new models as compared with the ones now in use. 12 respondents in all have mentioned changes in the form of the training as described here.

(2) Content

15 respondents mentioned changes in the content of the training programmes as foreseen or wished for the future. These are the following:

a. Emphasis on science and technology.
b. More specialisation (2).
c. More research-oriented.
d. Emphasis on Communications and Inf. Science.
e. General improving of methods and techniques.
f. Analysis of the users' needs.
g. Special attention to social role of inf. + libr. Service.
h. Emphasis on post-experience courses.
i. Emphasis on data and information collection, storage and retrieval.
j. Systems approach for the structure of several disciplines in the course.
k. Updating with modern aspects of documentary information.
l. Application of machine selection teaching.
m. More attention to new information techniques (2).

In general the replies concerning changes in the programmes as to their content are rather vague and they are moreover so disparate that no general trend can be identified.

As for the modification of the level (degree level) of the courses and the official degree or diploma conferred, replies indicate a further academic specialisation, whereas only 1 institution mentions an important change in the form of teaching (small seminar groups) and puts emphasis on the individual work.

Re: Future changes in the programme (q. 13)

1. More small-group seminars; individual working at own pace; programmed leaving when appropriate.
2. Changes are certainly coming; cannot be specified now.
3. Increasing emphasis on science and technology.
4. ---
5. ---
6. ---
7. ---
8. ---
9. ---
10. ---
11. Fall 1972: major curriculum revision.
12. Programme has been phased out mainly because of financial reasons.
13. Additional specialisations.
14. No changes foreseen.
15. Yes, introduction of MA degree.
16. All library students will be studying for MS. Programme will be more research-oriented.
17. More emphasis on Communications and Information Science through merger with two other programmes at the University
18. Plans for a 6th year programme in Urban Librarianship and Information Science.
19. ---
20. No changes foreseen.
21. Programme is under continuing review and evaluation. (not specified).
22. Plans to initiate doctoral study in Library and Information Science by 1973/1974.
23. ---
24. Improving methods and techniques.
25. ---
26. ---
27. For the moment no. Changes are discussed by body of professors.
28. Cannot be predicted, as a new programme is just under way.
29. Not at present, since this is determined by the requirements of the Library Association's syllabus.
30. Less emphasis on traditional skills and more on analysis of users' needs and social role of library and information services.
31. ---
32. There are changes coming, but at the present too diffuse to particularize.
33. Possibility of CNAA Degree Course more broadly based, more interdisciplinary and including elements of sociology, psychology, computers and statistics.
34. Impossible to predict.
35. The BA course is under revision for re-submission to Council for National Academic Awards as an Honours Degree Course.

36. Possibility of special options.
37. Greater emphasis foreseen on post-experience courses and higher degree level courses.
38. Revision of courses is continuous process to meet various requirements.
39. Both in structure and content. Subject "Management Information System" (MSI) with emphasis on data and information collection concerning requirements of management functions at various levels, generating new pertinent data and information out of these, their storage and retrieval has recently been included. General policy - including regularly new dev. in the syllabus.
40. ---
41. Changes will take place according to the country's needs.
42. Under study a new core programme affecting all library schools in Brazil. We are also planning a systems approach for the structure of the several disciplines of the course.
43. No changes are foreseen.
44. Up-dating the curriculum with modern aspects of documentary information.
45. ---
46. ---
47. ---
48. Planning to develop a PhD programme in the near future.
49. ---
50. The programme has just been improved (1971/72).
51. Team working on project of new model of library and information training. It will finish its work in 1975.
52. A new training programme is foreseen for 1975/76.
53. ---
54. University reform of last year brought about also modernisation of library training programme. Plans for teaching application of machine selection.
55. We wish to specialise the courses more, make them correspond to the new information technique.
56. (a) Lower Diploma in School Librarianship; (b) Higher Diploma in School Librarianship; (c) more attention to new techniques.
57. ---
58. Post-graduate course has only just started (autumn 1972).

Further training and exchange of experience (q. 15 and 16)

1. Further training increasingly desirable, whatever available but often leading to higher degree. In favour of exchange.
2. Further training desirable (up-dating courses, workshops, or institutes). In favour of exchange.
3. Both continuing education (not specified) and PhD work. In favour of exchange.
4. ---
5. ---
6. ---
7. ---
8. ---
9. ---
10. In favour of exchange.
11. Many graduates return for additional courses in Continuing Education. In favour of exchange.
12. Continuous up-dating courses essential for quality programme. Exchange would be useful but level of programmes differs; excellent coord. programme would be essential.
13. Continuous training/up-dating courses. In favour of exchange.
14. Continuous up-dating. In favour of exchange.
15. Continuous up-dating. In favour of exchange.
16. Specialised short courses. In favour of exchange.
17. Subject degree in addition to library science is most advantageous; continuing education regarding new technology is desirable. In favour of exchange when feasible.
18. Many students do and take continuing education courses or attend short-term institutes. We are always open to such exchange.
19. ---
20. Further course work, advanced degrees.
21. Continuing education in the form of seminars. In favour of exchange.
22. Continuing education, both credit and non-credit; at present little work of this type. In favour of exchange.
23. Continuing education, up-dating courses. In favour of exchange.
24. Post-graduate specialization courses.
25. Further short courses - up-dating courses. In favour of exchange.
26. ---
27. Further short courses, up-dating courses. In favour of exchange.
28. Up-dating courses. In favour of exchange.
29. Short courses on (1) special subjects; (2) information work for mature entrants with technical qualifications. In favour of exchange.
30. ---
31. For BSc practical experience and for MSc idem. For PhD, no.
32. In favour of cont. training, in favour of exchange (not specified).
33. Up-dating courses. Definitely in favour of exchange.
34. Up-dating courses. In favour of exchange.
35. Short post-experience courses are desirable to up-date information or consider new developments. The British Library schools are closely linked through the Association of British Library Schools and the Library Education Group of the Library Association. Exchanges of experience with schools abroad would be useful.
36. Cont. education not necessary. Discussions are always helpful.
37. Further courses are desirable and we are working in the field of advanced short courses of an up-dating character and with assistance to libraries in the form of in-service training schemes designed by the Department. In favour of exchange.

38. Up-dating courses, discussions. In favour of exchange.
39. Both students and professors are in favour of cont. education. This is why our educational programme includes organisation of short-term (2-5 months) advanced training in some particular field for individual candidates, mid-year refresher-seminar and an annual seminar.
40. Annual seminars and refresher courses organised by the Centre provide keeping up to date with the trends in the field.
41. ---
42. Students and professors consider the realization of up-dating courses, advanced courses, specialised courses a great necessity. We consider very useful an exchange of experience with other training institutes.
43. In favour of exchange.
44. Continuous training for the new staff and up-dating courses for staff working in the field of documentation information. In favour of exchange.
45. In favour of cont. education (not specified); in favour of exchange.
46. ---
47. ---
48. Up-dating courses. In favour of exchange.
49. ---
50. In favour of exchange.
51. Continuous training and up-dating courses are highly desirable. In favour of exchange.
52. Post-graduate specialization courses. In favour of exchange.
53. ---
54. Continuous training of librarians and documentalists. In favour of exchange.
55. ---
56. In favour of cont. training (not specified). In favour of exchange.
57. Up-dating courses. In favour of exchange.
58. Up-dating courses. In favour of exchange.

2. Detailed examples of categories of curricula

Introduction

Like all other disciplines of contemporary science, library and information sciences are undergoing changes which are even more rapid and more fundamental than those occurring in most other sciences, as this field is a rather young specialization, grown out of needs which have become more and more evident over the last twenty years. Information science being an instrument that should be adapted to the different kinds of information users - that is to say to scientific researchers having, thanks to it, at their disposal a network of easy cross-reference and of information concerning the research of other specialists in their or a related field, and those who need it for a more direct application - it should and does in fact cover a wide field of interest. As this science has grown out of needs felt, its development is essentially different from that of other sciences and accounts for the variety of approaches which clearly show in the curricula offered to those who wish to specialize in this field. In some cases subjects are taught which are clearly geared to the needs of one specific country, others show heavy leaning on more sophisticated means such as computer science and others again are still progressing on the way starting with the traditional library.

It is, therefore, not easy to give a homogeneous over-view of existing training and educational facilities and it seems to be even more difficult for most of the training and education institutes, to equally represent in their curricula the various aspects of what is meant by information and library science.

Categories

We can say, however, that the material received allowed us to specify the following four approaches or categories in the organization of information science curricula:

1) The theoretically oriented curriculum

These curricula are based upon the premise that information science is a distinct discipline with its own methodology and research interests. Schools or institutes having this orientation emphasize theoretical courses drawn from the formal disciplines of mathematics, logics, and perhaps linguistics. The emphasis of the entire programme is on theory, methodology and research.

2) The computer science oriented curriculum

This curriculum places primary emphasis on the computer. Such programmes are generally located in engineering schools and the programme of study stresses the mathematics and logics courses with a view to computer hardware and software design. Applications also constitute a teaching subject, but here too engineering and mathematics are emphasized, as is the use of computers to design hardware components. Other applications that might be included are linguistics, information retrieval, etc.

3) The library oriented curriculum

This curriculum tends to identify information science and documentation, and the programmes are usually located in the Library School. The emphasis is on the use of computers in libraries and the course of study includes library

automation, circulation control, on-line cataloguing, etc. Also included are courses in information retrieval and dissemination, automatic indexing and abstracting, and the automation of other library processes.

4) The systems oriented curriculum

Here we find emphasis on the methodology of systems analysis as it applies in one or more institutional contexts. The curriculum deals with the design and analysis of information systems, information retrieval, library networks, etc. The emphasis is on management and decision-making aspects of information systems rather than on the operational and service needs.

EXAMPLES OF THEORETICALLY ORIENTED CURRICULA

1.	The Georgia Institute of Technology - School of Information and Computer Science	71/72	72/73
2.	Harvard University - Center for Research in Computing Technology	71/72	72/73
3.	The Illinois Institute of Technology - Dept. of Computer Science	71/72	
4.	The Illinois Institute of Technology - Science Information Program	71/72	72/73
5.	The Iowa State University - Dept. of Computer Science	71/72	
6.	The University of Maryland - School of Library and Information Services		72/73
7.	The University of Michigan - Dept. of Computer and Communication Sciences	71/72	
8.	Lehigh University - Graduate Studies and Research in the Information Sciences		72/73
9.	The University of Iowa - Department of Computer Science		72/73
10.	The City University London - Information Science MSc Degree Course	71/72	
11.	The University of Chicago - Committee on Information Sciences	71/72	
12.	Keio University - School of Library and Information Science		72/74
13.	Warsaw University - Post-graduate Study in Informatics		72/74
14.	Indian Statistical Institute - Documentation Research and Training Centre (DRTC)	71/72	

GEORGIA INSTITUTE OF TECHNOLOGY

SCHOOL OF INFORMATION AND COMPUTER SCIENCE (1971 - 1972)

Description of Programme:

The master's programme offers professional education in two related fields: information systems engineering and computer systems engineering. The emphasis of the Information Systems option of study is on the analysis, design, and management of advanced information systems and networks such as corporate information systems, command/control systems, knowledge networks and learning systems. Although applications oriented, the curricula stress theoretical foundations of the profession, particularly logic, language theory, systems theory, and applied mathematics as well as management science.

Information Science Courses: (credit in quarter hours)

Topics in Linguistics (3)
Computer Languages (3)
Mathematical Technques for Information Science (3)
Elements of Information Theory (3)
Information Systems (3)
Logistics Systems (3)
Computer Systems (3)
Communication and Control of Information (3)
Syntax of Natural Languages (3)
Mathematical Linguistics (3)
Information Control Methods (3)
Theory of Communication (3)
Information Processes I (3)
Information Processes II (3)
Information Mesures (3)
Information Systems Design I, II (3)
Problems in Systems Design (2)
Advanced Semiotics (3)
Advanced Logic (3)
Philosophy of Mind (3)
Artificial Intelligence (3)
Computer Techniques for Information Storage and Retrieval (3)
Computer Operating Systems (3)
Design of Computer Operating Systems (3)
Evaluation of Computer Systems (3)
Computer Language Design (3)
Organization and Management of Information Industry (3)
System Theory I (3)
System Theory II (3)
Pattern Recognition (Special Problems Course) (3)
Philosophy of Language (3)
Management Information Systems Design (Special Problems Course) (3)
Theory of Automata (3)
Information Systems Optimization (3)
Advanced Systems Design (3)
Syntax-directed Compilation (3)

GEORGIA INSTITUTE OF TECHNOLOGY

SCHOOL OF INFORMATION AND COMPUTER SCIENCE (1972 - 1973)

Description of Programme:

(idem as 1971-1972) added paragraph:

In association with the Emory University School of Medicine, the school also offers graduate programmes in biomedical information and computer science, leading to the degrees of Master of Science in Information and Computer Science, and Doctor of Philosophy. The Master of Science Programme emphasizes the engineering design of advanced information processing applications and systems in health care and biomedicine. The doctoral programme stresses course work and dissertation research in biomedical information and computer science.

Information Science Courses : (credit in quarter hours)

(idem) +

Data Management Systems (3)
Introduction to Mathematical Linguistics (3)
Artificial Intelligence and Heuristics (3)
The Literature of Science and Engineering (3)
Data Communications (3)
Basic ADP Systems Design (3)
Science Information Systems (3)
Health Information Processing (3)
Formal Semantics (3)
Information Storage and Retrieval (3)
Introduction to Information Processes I (3)
Introduction to Information Processes II (3)
Selected Topics in Information and Computer Science
Cybernetics (3)
Equipment of Information Systems

HARVARD UNIVERSITY - DIVISION OF ENGINEERING AND APPLIED PHYSICS - CENTER FOR RESEARCH IN COMPUTING TECHNOLOGY (1971 - 1972)

Description of Programme:

The Center was established in July 1971 for the purpose of reorganizing computer science activities at Harvard so as to provide coherence and focus for research and training, and to provide the visibility necessary to raise funds required for adequate support. Four basic objectives of the Center are: (1) research in "core" areas of computer science as well as research centered around the application, use and impact of computers; (2) training of graduate students; (3) development and co-ordination of courses in the computer science area; (4) development of a programme enabling faculty and graduate students in other departments to draw on the expertise of the members and staff of the Center.

Information Science Courses:

(ES: Engineering Sciences; AM: Applied Mathematics)

ES 110 Introduction to Computer Programming (half course)
ES 112 Introduction to Digital Computers (half course)
ES 113 Introduction to Programming Languages (half course)
ES 119 Introduction to Decision and Control (half course)
AM 215 Decision Theory (half course)
AM 219a System Programming-Data Structures (half course)
AM 219b System Programming-Control Structures (half course)
AM 220r Seminar in Operating System Design (half course)
AM 221 Information Retrieval and Question-Answering (half course)
AM 251a Operating Systems Architecture (half course)
AM 251br Seminar: Operating Sysem Optimization (half course)
AM 252a Computer Graphics (half course - not given 1971-72)
AM 252br Seminar: Computer Graphics (half course)
AM 260 Advanced Programming Languages (half course)
AM 261r Software Laboratory (full course)
AM 271 Seminar: Technology and Education (half course)
AM 294r Special Topics in Automata Theory and Mathematical Linguistics (half course not given 1971-1972)
AM 295 Theory and Construction of Compilers (half course)
AM 297 Automata Theory (half course - not given 1971- 1972)

HARVARD UNIVERSITY - DIVISION OF ENGINEERING AND APPLIED PHYSICS - CENTER FOR RESEARCH IN COMPUTING TECHNOLOGY (1972 - 1973)

Description of Programme:

(idem)

Information Science Courses:

add

ES 119 Introduction to Decision and Control (half course)

revise

AM 110 Introduction to Computer Programming (formerly Engineering Sciences 110)
AM 112 Introduction to Digital Computers (formerly Engineering Sciences 112)
AM 113 Introduction to Programming Languages (formerly Engineering Sciences 113)

ILLINOIS INSTITUTE OF TECHNOLOGY - DEPARTMENT OF COMPUTER SCIENCE (1971 - 1972)

Description of Programme:

A balanced theoretical and practical curriculum stressing software systems design and implementation, the theory of computing, computer applications in related fields and computer architecture.

Information Science Courses: (credit in semester hours)

Programming for Digital Computers (2)
Data Processing and File Management (3)
Mathematical Structures of Information Science (3)
Programming Languages (3)
Computer Operating Systems (3)
Telecommunications Systems (3)
Information Storage and Retrieval (3)
Computer Graphics (3)
Image Processing and Pattern Recognition (3)
Formal Language and Syntactic Analysis (3)
Compiler Construction I (3)
Computer Assisted Instruction (3)

ILLINOIS INSTITUTE OF TECHNOLOGY - SCIENCE INFORMATION PROGRAM (1971 - 1972)

Description of Programme:

Science Information is a new interdisciplinary curriculum concerned with the management and processing of technical and scientific information. It brings together four related areas of study: information processes, library systems, technical writing, and management and operation of information centres. The programme is health and biomedically oriented.

Information Science Courses:

Information Storage and Retrieval
Introduction to Linguistics
Systems Analysis and Management
Library Automation
Audio-Visual Aids

ILLINOIS INSTITUTE OF TECHNOLOGY - SCIENCE INFORMATION PROGRAM (1972 - 1973)

Description of Programme: (idem)

Information Science Courses:

add

534 Literature of Modern Science (3)
538 Introduction to Publishing and Pringing (1)
551 Medical Information Systems Analysis (4)
561 Management and Operation of Information Centers (3)
585 Projects in Bio-Medical Information Storage and Retrieval Systems (4)

delete

Introduction to Linguistics
Systems Analysis and Management

revise

537 Visual and Audio-visual Materials (2) (formerly Audio-Visual Aids, unnumbered)
541 Information Storage and Retrieval (2) (formerly unnumbered)
542 Library Automation (1) (formerly unnumbered)

IOWA STATE UNIVERSITY - DEPARTMENT OF COMPUTER SCIENCE (1971 - 1972)

Description of Programme:

The emphasis in this programme is primarily on theoretical aspects, with secondary emphasis on current techniques and applications. The PhD degree is a research-oriented degree, and the candidate is required to produce a dissertation that shows a significant contribution to knowledge in computer science. In addition, he is expected to demonstrate high attainment and proficiency in computer science. The Master's degree is less rigorously research-oriented. It is available with thesis for those who wish to pursue a research project, and it is also available without thesis.

Information Science Courses: (credit in quarter hours)

C.S.501 Programming Languages and Operating Systems (3)
C.S.502 Programming Languages and Operating Systems (3)
C.S.503 Programming Languages and Operating Systems (3)
C.S.551 Structure and Processing of Information (3)
C.S.552 Structure and Processing of Information (3)
C.S.553 Structure and Processing of Information (3)
C.S.610 Seminar (2 or 3)

UNIVERSITY OF MARYLAND - SCHOOL OF LIBRARY AND INFORMATION SERVICES (1971 - 1972)

Description of Programme:

The School's concern is with the clarification and definition of the intellectual character of the field of library and information service first, and then with the development of its capability for translating these assessments into actual programmes, courses and other activities. At the Master's level the orientation is toward introducing the student to the enlarged responsibilities which librarians must be prepared for and committed to undertake during the years ahead. By means of a new information science option the student can choose to equip himself or herself with modern quantitative tools and techniques needed to understand and solve technical information problems. Library-oriented courses form the bulk of the offerings being understood as electives for the information science option.

Information Science Courses: (credit in semester hours)

LBSC 627 Governmental Information Systems (3)
LBSC 650 Fundamentals of Documentation (2)
LBSC 653 Construction and Maintenance of Indexing Languages and Thesauri (3)
LBSC 656 Introduction to Information Retrieval Systems (3)
LBSC 657 Testing and Evaluation of Information Retrieval Systems (3)
LBSC 674 Introduction to Reprography (3)
LBSC 700 Introduction to Library Data Processing (3)
LBSC 705 Advanced Data Processing for Libraries (3)
LBSC 711 Programming Systems for Information Handling Applications (3)
LBSC 715 Library Systems Analysis (3)
LBSC 737 Topics in Information Science (3)
LBSC 740 Seminar in Library and Information Networks (3)
LBSC 757 Library and Information Service Facilities - Objectives and Performance (3)
LBSC 807 Science Information and the Organization of Science (3)
LBSC 815 Library Systems (3)
LBSC 837 Seminar in Information Transfer (3)
LBSC 855 Analysis of the Library Service Process (3)
LBSC 859A Data Processing Workshop in Library Applications (3)
LBSC 859C Library Operations Research (3)
LBSC 859D Mathematics for Library Effectiveness (3)

UNIVERSITY OF MARYLAND - SCHOOL OF LIBRARY AND INFORMATION SERVICES (1972 - 1973)

Description of Programme: (idem)

Information Science Courses: (credit in semester hours)

add

LBSC 647 Special Problems in the Organization of Knowledge (3)
LBSC 852 Seminar in Research Methods and Data Analysis (3)
LBSC 736 Advanced Organization and Administration of Libraries and Information Services (3)

delete

LBSC 859A Data Processing Workshop in Library Applications

revise

LBSC 721 Topics in Information Science (formerly LBSC 737)
LBSC 726 Seminar in Information Transfer (formerly LBSC 837)
LBSC 859F Library Operations Research (formerly LBSC 859C)

UNIVERSITY OF MICHIGAN - DEPT. OF COMPUTER AND COMMUNICATION SCIENCES (1971 - 1972)

Description of Programme:

The computer and communication sciences are concerned with understanding, on a theoretical basis, the communication and processing of information by both natural and artificial systems. Two general areas of study are particularly important for these sciences: (1) the technical study of natural and artificial languages as modes of communication, and (2) the investigation of informtion processing, both in natural and artificial systems. Natural systems include the heart, the central nervous system, genetic and evolutionary systems, and behavioural systems; artificial systems include digital and analog computers, telephone networks and television systems. In the technical study of languages, attention is given both to natural languages and to various types of artificial languages, including codes used in communication sciences, instructional and design languages for digital computers, and the formal languages of mathematical logic. In the investigation of information processing systems, attention is directed toward fixed and growing automata,adaptive systems, nerve nets, evolutionary systems, adaptive behavioural systems, and language systems.

The Michigan programme is unique in its breadth and connections with natural systems. All students receive some instruction in the informational and computer aspects of natural languages, biological systems, and behavioural systems, and considerable research is being done in these areas by faculty and students.

Information Science Courses

Digital and Analog Systems (3)
Data Structures (3)
Theory of Automata (3)
Adaptive Systems (3)
Man as in Informtion Processing System (3)
Information Theory (3)
Theory of Natural Language Structure (3)
Mathematical Linguistics (3)
Logic, Grammar and Information Processing (3)
Artificial Intelligence (3)
Operating Systems (3)
Simulation Languages and Techniques (3)
Data Structures and Compiling Techniques (3)
Informational Aspects of Biochemistry and Physiology (3)
Biological Sensory Systems (3)
Computational Logic
Algebraic Theory of Automata (3)
Theory of Adaptive Systems (3)
Neural Models and Psychological Processes (3)
Computational Linguistics
Theories of Grammar (3)
Acoustic Foundations for Computational Speech Processing (3)
Advanced System Programming (3)
Seminar in Natural Languages (3)
Seminar in Programming (1-3)
Seminar in Programming (1-3)
Seminar in Automata Theory (3)
Seminar in Adaptive Systems Theory (3)
Artificial Intelligence Seminar
Artificial Intelligence Seminar (3)

LEHIGH UNIVERSITY - GRADUATE STUDIES AND RESEARCH IN THE INFORMATION SCIENCES (1971 - 1972)

NO INFORMATION AVAILABLE

LEHIGH UNIVERSITY - GRADUATE PROGRAM IN INFORMATION SCIENCE (1972 - 1973)

Description of Programme:

The rate of change in information technology demands that the practitioner, in order to participate in and contribute to existing and developing systems, be thoroughly grounded in the conceptual fundamentals of his field. To this goal, the M.S. and PhD. degree programmes offered by the Vision of Information Science are designed to fulfill several objectives. Each programme provides a broad base of both theory and application. Emphasis is on fundamentals, rather than techniques. Basic to the programme of information science at Lehigh is the concept that research and instruction reinforce each other. Consequently, whenever possible, students are expected to participate in research and operations on a part-time basis.

Three core areas are at the heart of the M.S. programme: information processing systems; information retrieval theory; and analysis of information. Beyond this basis core, student schedules are planned on an individual basis to fit previous academic experience and career goals. Two opinions are open for specialization: Systems, emphasizing the integration of machine and human capabilities and techniques; and Foundations, dealing with the theoretical and systematic consideration of information systems and processes.

The PhD. in Information Science covers such diverse topics as mathematical logic, information systems, command and control systems, computer programming, computer languages, control systems, systems analysis, operations research, computational linguistics, probability theory, statistics and statistical inference, switching theory, graph theory, algebra, topology, automata theory, and artificial intelligence.

Information Science Courses

Descriptive Linguistics
Psycholinguistics
Statistical Linguistics
Introduction to Information Methodology
Application of Non-Numerical Automata
Theory of Formal Grammars
Computer Languages
Mathematical Methods in Information Science
Information Retrieval Theory
Introduction to Library Organization
Library Automation
Readings in Information Science
Seminar in Psycholinguistics
Special Topics in Linguistics
Analysis of Information Systems
Subject Document Retrieval
ALP-Aided Document Retrieval
Design of Executive Systems
Document Retrieval Evaluation
Evaluation Models
Retrieval Languages
Mathematical Models in Linguistics
Retrieval Structures
Sentence Syntax
Thesis (Master's Degree)
Thesis (Master's Degree)
Special Topics in Information Science

UNIVERSITY OF IOWA - DEPARTMENT OF COMPUTER SCIENCE (Mac Lean Hall) - (1972 - 1973)

Description of Programme:

The primary emphasis in this programme is on theoretical aspects, with secondary emphasis on current techniques and applications.

Information Science Courses: (credit in semester hours)

22C:201 Algebraic Automata Theory (3)
22C:245 Artificial Intelligence II (3)
22C:257 Formal Languages (3)
22C:295 Seminar on Artificial Intelligence
22C:297 Seminar on Automata

THE CITY UNIVERSITY - CENTRE FOR INFORMATION SCIENCE

Lionel Denny House, 23 Goswell Road, London, E.C.1.

I. Information Gathering

Sources of information
Characteristics of sources of information, comparative evaluation, and appropriate means of exploitation.

PUBLISHED AND UNPUBLISHED SOURCES

Individual sources and organizations; oral, visual, and non-documentary sources.

BRITISH AND FOREIGN SPECIALIZED SOURCES

Libraries, learned societies, trade organizations, research associations, national and international bodies.

METHODS OF LOCATING SOURCES

Making efficient use of all types of sources for obtaining detailed information.

II. Information storage and retrieval

CLASSIFICATION THEORY

Hierarchic and scientific classification, and classification by synthesis; logical principles and advanced research methods; principal classification systems at present use.

INFORMATION STORAGE AND RETRIEVAL

Indexing; large-scale mechanical and electronic methods; information retrieval systems; computer production of indexes and selective dissemination of information; problems of testing systems; statistical evaluation. Survey of recent and current advanced research in information retrieval.

COMPUTERS

The principle of operations of computers and their applications to information retrieval.

APPLICATIONS OF OTHER SCIENTIFIC DISCIPLINES

The applications of psychology, linguistics, semantics analysis and logic to information retrieval.

III. Dissemination of Information

FLOW OF INFORMATION

Theory of human communications and the problems in research and industry, especially in small and medium-sized firms.

ABSTRACTING

The techniques of abstracting and the production of abstracts journals.

ORGANIZATION OF THE FLOW OF INFORMATION

The flow of information in research, industry, and government; role of international organizations in the dissemination of information; liaison and advisory services.

ERGONOMICS

The application of ergonomics to information work.

IV. Legal and Commercial Aspects of Information Work

LAW

Patents, Trade Marks, Registered Designs, and Copyright Law.

STANDARDS

National, international and industrial standards; organizations dealing with standards.

V. Administration and Other Aspects of Information Work

MANAGEMENT OF INFORMATION DEPARTMENTS

Staffing problems and organizational aspects and relationships; economics of information services.

REPRODUCTION AND PRESENTATION OF INFORMATION

Copying and reproduction methods; methods of typography, printing and illustration in relation to problems of efficient communication.

LANGUAGE STUDIES

Tuition in one foreign language to good technical reading standard; principles of translation and transliteration, and linguistic problems in information work.

UNIVERSITY OF CHICAGO - COMMITTEE ON INFORMATION SCIENCES (1971 - 1972)

Description of Programme:

The Committee on Information Sciences offers graduate programmes in the general area of computers, systems, communication, and control. Master's-level courses cover both theoretical foundations and some of the more pragmatic aspects of computer systems and applications. The intention is to emphasize principles of broad and continuing applicability, thereby providing students with a strong scientifically-oriented background into which specific technological information can be readily assimilated. The doctoral programme is flexible, and might appropriately include courses offered by the departments of Mathematics, Statistics, Theoretical Biology, Philosophy, and Linguistics; the Graduate School of Business; and the Graduate Library School. Interdisciplinary dissertation research is facilitated by associations, through joint appointments and other means, between the Committee and other University units.

Information Science Courses:

Organization of Computer Systems
Information Theory (Statistics)
Information and Communication Theories
Information of Automata
Formal Languages
Computer Operating Systems
Data Structures
Compiler Construction
Introduction to Cognitive Systems (Theoretical Biology)
Science of Communication (Linguistics, Library Science)
Mechanical Translation and Language Processing (Library Science, Linguistics)
Information Retrieval (Library Science)
Information Systems (Business)
Reading and Research in the Information Sciences

KEIO UNIVERSITY - SCHOOL OF LIBRARY AND INFORMATION SCIENCE - JAPAN

Graduate Courses:

Information Science and Technology: Introduction (4)
Concerning the generation, recording, transmission, processing and use of information, discusses various types and forms of representation of information, the efficiencies of message transmission, and devices for information processing.

Information Science and Technology: Seminar (4)
Examines scientific research methods applicable to research in information science and technology and guides individuals to specific themes for and preparation of research papers, with special consideration for the graduate thesis project of the individual student.

Structure of Information I (2)
Based on the concepts of linguistics and logic, discusses the structure of sentences, the relation between words and concepts, as expressed by natural language or other means; examines stratification of concepts, forms of logical expression and of judgment, and studies semantic approaches from the linguistic as well as logical points of view.

Structure of Information II (2)
Discusses methods of analyzing and using information mathematically or quantitatively.

Structure of Information: Seminar (2)
Applies principles discussed in 'Structure of Information' to analysis of information.

Information Systems (4)
Clarifies components and functions of information systems, their operations, design and management, and examines methods of information systems analysis and evaluation, considering application of the concepts of information systems.

Information Systems: Seminar I (2)
Case studies of methods of organizing,operating and evaluating information systems of research institutions.

Information Systems: Seminar II (2)
Discusses studies of information needs and uses and examines previous study projects and experiments to increase the efficiency of information systems.

Research Methods I (2)
Introduces basic research methods observed in disciplines of science and technology and examines methods of searching for needed information produced in the research processes.

Research Methods II (2)
Introduces basic research methods observed in disciplines of the humanities and social sciences and examines methods of searching for needed information produced in the research processes.

Information Media (4)
Discusses and examines various media in communication and clarifies the flow of information and use patterns.

Information Media: Seminar (2)
Examines processes from the generation to use of information as reflected in various materials, media and sources of information, with case studies of the relations between information and media.

Information Storage and Retrieval, Advanced I (4)
Types of information sources and information, kind of symbols, methods of symbolization, subject analysis, terms and forms for indexing, quantitative problems, and applications of computers are discussed.

Information Storage and Retrieval, Advanced II (2)
Discusses theories of indexing and abstracting for information storage and retrieval.

Information Storage and Retrieval, Advanced III (2)
Codes and coding methods are introduced. Their application, as well as their characteristics, are discussed.

Information Storage and Retrieval: Seminar I (2)
Classification systems of various kinds are studied and their applications are discussed.

Information Storage and Retrieval: Seminar II (2)
Discusses the behaviour of natural language in information storage and retrieval systems.

Information Storage and Retrieval: Seminar III (2)
Case studies are made of specific applications of the theories introduced in 'Information Storage and Retrieval, Advanced II'.

Mechanization in Information Handling (4)
Introduces basic components of computer systems, discusses principles of programming, outlines programming systems, and examines application of the techniques to information handling systems.

Mechanization in Information Handling: Seminar (2)
Considers application of the principles introduced in 'Mechanization in Information Handling', including practical operation of computerized systems.

UNIVERSITY OF WARSAW - POST-GRADUATE STUDY IN INFORMATICS (1972 - 1974)

Study courses

1. LOGIC - Elements of set theory and mathematical logic; elements of semiotics; some methodological problems of sciences; logic of information science.

2. MATHEMATICS - Selected problems of algebra; elements of mathematical analysis; principles of calculus of probability and of statistics; elements of mathematical theory of information; general introduction to modern mathematics.

3. CYBERNETICS - Basic notions of cybernetics; control and feed-back problems; cybernetic methods and their applications; system-oriented approach of problems.

4. PSYCHOLOGY - Perception of information and information processes by the human brain; psychological aspects of processing and transmission of information; elements of the psychology of work (human relations, information user work analysis, elements of testing methods).

5. SOCIOLOGY - Basic notions of sociology and elements of research techniques with special emphasis on the methodology of enquiry methods.

6. SCIENCE OF SCIENCE - General introduction to science and technology problems, problems of research and design; scientific creativity and presentation of research results; research teams and research institutions; optimation of structures and processes; organization of science and scientific development policy.

7. LINGUISTICS - Natural language problems; basic introduction to linguistic trends and schools; formalization of natural language; problems of communication.

8 SCIENTIFIC AND TECHNICAL TERMINOLOGY - Problems of creation of scientific and technical vocabulary; principles of lexicography; general and specialized encyclopaedias; translation problems.

9. INTRODUCTION TO SCIENTIFIC INFORMATION - Theoretical basis of scientific information; terminological problems of scientific information; history of scientific information activity; encyclopaedic introduction to the basic problems of scientific information; the role of scientific information in modern development of science, technology and economy.

10. LIBRARIANSHIP - Classification and organization of libraries; organization of libraries network in Poland and in various other countries; function of libraries in information systems; specific problems of library information; trends in library development; trends in library research.

11. SOURCES AND VEHICLES OF INFORMATION - Classification and characteristics of information sources; usefulness of various primary information sources for various informational needs and principles for their selection; modern directions in scientific and technical periodicals publishing; types and characteristics of information vehicles.

12. REFERENCE PUBLICATIONS AND INFORMATION FACILITIES - Basic principles of scientific documentation processing of primary documents; types and methodology of secondary document processing; their characteristics and function in the information process; various types of information facilities such as files, bibliographies, abstract publications, bibliographical indexes, etc.

13. INFORMATION LANGUAGES I - Theory and classification of information languages; mono- and poly-hierarchic information languages; different types of classifications with special emphasis on Universal Decimal Classification; general principles and methods of indexing; methods and parameters of comparative analysis of information languages.

14. INFORMATION LANGUAGES II - Dictionary-type languages; descriptor languages; SYNTOL, BIT, semantic code; development trends in information languages; methods of indexing with descriptors and natural language words.

15. INFORMATION RETRIEVAL LANGUAGES AND THEIR TECHNICAL MEANS - Definition of information retrieval systems and their theory; classification and characteristics of systems; some general concepts concerning manual information systems, mechanized systems and automated systems; characteristics of technical means; determination of system efficiency; trends in development.

16. COMPUTER PROBLEMS - The construction, functioning and structure of computers and of hardware components; problems of computer programmes; computer applications in information retrieval; trends in computer applications.

17. TRANSMISSION OF INFORMATION - Principles and methods of document dissemination; addressed, universal, individual and collective information; information dissemination techniques; multiplication techniques; copyright problems; principles of text processing and editing problems.

18. INFORMATION USERS - Classification and characteristics of user groups, their information needs; methods and techniques of information needs research; collaboration between information officer and information user; organization and methods of user training in the use of information; methods of propaganda for the use of information collections and services.

19. ORGANIZATION AND ECONOMICS OF INFORMATION - Information organization systems; information networks and their construction; the organization of informational activity in Poland and in other countries; international information systems and their development; international co-operation; organization of the work of information centres; employment in information and qualifications needed; informational equipment; planning and financing of information activity and methods of determining its economic activity.

INDIAN STATISTICAL INSTITUTE - DOCUMENTATION RESEARCH AND TRAINING CENTRE (DRTC)

(1971 - 1972)

Training in Documentation

Description of Programme:

The course offers comprehensive instruction in the theory and practice of documentation. It places emphasis on imparting theoretical knowledge of a high order and at the same time on equipping the student with the necessary professional competence based on practical experience. Instruction is largely individual. There is weekly essay work and colloquium designed to develop in the students the power of systematic thinking and expoaition.

Syllabus

G1 - UNIVERSE OF SUBJECTS: ITS DEVELOPMENT AND STRUCTURE

1. The various subjects having knowledge as the field of study. Their interrelation.

2. Primary senses. Association. Intellection. Imagination. Intuition.

3. Sensory experience. Intellectual experience. Individual's Externalized and Socialized memory. Thought-Term relation. Nomenclature. Terminology. Fundamental terms and their standardization.

4. Fact. Empirical law. Descriptive formulation. Fundamental law. Hypothesis. Normative Principles. Interpretative explanation. Deduction. Empirical verification. Abstraction. Generalization. Concretization. Particularization. Spiral of Scientific Method.

5. Positivistic, Speculative and Authority-centred modes of thinking. Methods of pure sciences, applied sciences, humanities and social sciences.

6. Universe of subjects as mapped in schemes for library classification. Its demarcation into sections and sub-sections. Universe of subjects as a static continuum.

7. Interrelation of sections. Modes of interrelation and cross-section. Formation of new sections. Modes of formation. Fission. Lamination. Loose assemblage. Fusion. Distillation. Universe of subjects as a dynamic continuum.

G2 - DEPTH CLASSIFICATION (THEORY)

1. General theory of classification and its canons. Theory of classification of subjects. Work in the idea plan, verbal plance and the notational plane. Canons for each of the planes. Basic class. Isolate. Facet Analysis. Phase Analysis. Focus. Simple, compound and complex foci. Inter-subject, intra-schedule and intra-array phase relation. Principles for helpful sequence.

2. The five fundamental categories and the facets corresponding to them. Rounds and levels of manifestation of the fundamental categories. Postulates for idea plane. Principles for helpful sequence of any two facets.

3. Array. Telescoping of arrays. Telescoping of facets. Common isolate: anteriorizing and posteriorizing. Quasi-common isolate. Specials isolate. Quasi isolate. Speciator. Environmental isolate. Superimposed isolate. Principles for sequence of isolates in an array.

4. Enumerative, Nearly-enumerative, Almost-faceted. Fully faceted, Rigidly faceted, and Freely faceted classification. Analytico-synthetic classification. Enumeration of isolates. Formation of isolates by alphabetical, chronological, geographical, environment or subject device. Zone and Sector analysis. Abstract classification.

5. Notational plane. Postulates for notational plane. Co-extensive class number. Individualising class number. Expressive class number. Mixed notation. Sector notation within an array. Group notation. Hierarchical and non-hierarchical notation.

6. Macro-thought. Classification for book arrangement. Micro-thought. Classification for documentation work. Depth classification. Other uses of library classification in a library. Use of classification in arranging materials other than documents. Classification and coding for machinery for finding documents.

7. Evolution of classificatory technique. Comparative study of Bibliographic Classification Colon Classification, Library of Congress Classification and Universal Decimal Classification. Standards for the elements of schemes for classification. Universal and special schemes for classification.

8. Classificationist and design of classification. Classifier and assignment of class number.

G3 - DEPTH CLASSIFICATION (PRACTICE)

1. Steps in classification.

2. Classification of books and articles by Colon Classification and Universal Decimal Classification.

G4 - LIBRARY CATALOGUE

1. Canons for cataloguing. Lay-out of a catalogue code. Standards for the elements needed in catalogue codes at the international, national, linguistic, and local levels.

2. Classified catalogue. Dictionary catalogue. Kinds of entries. Specific entry. General entry. Main entry. Added entry.

3. Choice of heading for main entry and book index entry for simple, multi-volumed and composite books, periodical publications and micro-documents.

4. Rendering of personal, geographical, corporate, and series names, and titles of books in headings of entries.

5. Title section in main entry and in any other specific entry.

6. Choice and rendering of heading in subject entries. Chain procedure. List of subject headings. Class index entry. See and See also subject entries. Cross reference index entry.

7. Author analytical. Subject analytical.

8. Comparative study of the latest editions of the Classified catalogue code with additional rules for the dictionary catalogue, the AIA code and the Rules for the dictionary catalogue.

9. Alphabetization and its problems. Abbreviation of titles of periodical publications. Bibliographical references.

10. Lay-out and additional rules for union catalogue, abstracting and indexing periodicals and national bibliography.

11. Canons of abstracting. Language: Sentence form; Kernel form; Technical terms; Popular terms. Use of standard fundamental constituent terms. Length of abstract. Symbiosis between Feature Heading and Abstract.

12. Cataloguing of non-conventional forms of documents.

G5 - DOCUMENTATION

1. Book and document; Macro-subject and Micro-subject; Nascent thought; Generalist and Specialist readers. Bibliography and documentation list. Commercial Service. Bibliographical Service. Abstracting Service.

2. Documentation work. On demand. In anticipation. On a specific subject. On all subjects. National and International coverage. Retrospective and current. Varieties of documentation list. Principles of selection for national and local documentation work.

3. Documentation Service: Facet analysis in helping the reader in the exact enunciation of his subject of interest at the moment. Document search. Data search. Search for entities having several specified properties or values.

4. Procurement of documents: National and international sources.

5. Types of document reproduction or reprography from the point of view of users and top management of documentation centres. Photostat. Enlargement. Microfilm. Microfiche. Microcard. Other kinds of reproduction. Storage and Preservation. Reading apparatus (Note: the engineering and technological aspects are excluded).

6. Translation service: Full-time translators. Panel of translators. Full-time editors. Translation bank. Machine translation. (Note: excluding engineering aspects and the actual work of translation).

7. Abstracting: abstracting personnel. Competence in subject field and classification. Use of author synopsis. Need for abstracting one and the same document in the abstracting media of several subjects. Abstract with slant. National and international co-ordination of abstracting service. Information about progress towards machine abstracting (Note:excluding engineering aspects).

8. Levels of organization for documentation. International,National, Local. Role of FID and Unesco as co-ordinating and promoting agencies.

9. Social factors making documentation necessary. Population pressure. Supplementing natural and near-natural commodities by artificial commodities made from unconsumable raw materials with the aid of technology. Reference service to research workers. Conservation of the research potential of the world. Research-in-parallel. Research-in-series. Plough-back of nascent ideas into the minds of the research team. Technical report writing. Digest service to top management. Service of audio-visual documents to the foremen and the men at the bench.

G6 - MANAGEMENT OF SPECIALIST LIBRARY

1. Specialist libraries.(...)
2. Kinds of specialist libraries (...)
3. Place of library in the parent body.(...)
4. Organization of the different types and kind of specialist libraries.(...)
5. Classification and filing of fugitive materials.(...)
6. Library administration. (...)
7. Reference service. (...)
8. Bibliographical service. Abstracting service.

G7 - MECHANIZED DOCUMENT FINDING SYSTEMS AND ELEMENTS OF STATISTICAL ANALYSIS

G7 (i) - MECHANIZED DOCUMENT FINDING SYSTEMS

1. Physical tools. (...)
2. Punched card systems. (...)
3. Electronic Machine-aided System. (...)
4. Elements of programming.
5. Systems such as MEDLARS, CAS, INTREX, MARC, UDC mechanization. Selective Dissemination of Information (SDI).
6. Managerial and economic aspects of the use of machine in document finding - local, national and international.
7. Use of mechanical aids in library routines.
8. Practical work and project.

G7 (ii) - ELEMENTS OF STATISTICAL ANALYSIS

1. Permutation and combination
2. Mathematical probability (...)
3. Frequency (...)
4. Average (...)
5. Correlation (...)
6. Sampling (...)
7. Design of experiment (...)
8. Additional ideas needed for Foc-Finder: System analysis. Linear programming.
9. Elements of operations research. Work Measurement.
10. Librametry (...)

EXAMPLES OF COMPUTER SCIENCE-ORIENTED CURRICULA

1.	Auburn University - Electrical Engineering Dept.	71/72/73	
2.	Bradley University - Computer Science Department	71/72/73	
3.	University of California at Los Angeles - Computer Science Department	71/72/73	
4.	Cornell University - Dept. of Computer Science	71/72/73	
5.	University of Houston - Computer Science Dept.	71/72/73	
6.	University of Maryland - Computer Science Dept.	71/72	72/73
7.	Massachusetts Institute of Technology - Electrical Engineering Department	71/72/73	
8.	McGill University - Graduate School of Library Science	71/72/73	
9.	State University of New York - College of Arts and Science Geneseo		72/73

EXAMPLE OF MIXED COMPUTER SCIENCE- AND LIBRARY-ORIENTED CURRICULA

10.	Case Western Reserve University - School of Library Science	70/71

AUBURN UNIVERSITY - EIECTRICAL ENGINEERING DEPARTMENT (1971 - 1972)

Description of Programme:

The Computer Science Programme in the Electrical Engineering Department is a computer science-oriented curriculum.

Information Science Courses: (credit in quarter hours)

Digital Computing Systems (3)
Multiprocessing Systems (3)
Computer Software Development (3)
Theory of Compilers (3)
Advanced Sequential Systems (3)
Pattern Recognition (3)

no changes 1972-1973

BRADLEY UNIVERSITY - COMPUTER SCIENCE DEPARTMENT (1971 - 1972)

Description of Programme:

This is a computer science-oriented programme.

Information Science Courses: (credit in semester hours)

Programming of Digital Computers (3)
Linear Programming (3)
Simulation of Man/Machine Systems (3)
Computer Operating Systems (3)
Structures of Assemblers and Compilers (3)

no changes 1972-1973

UNIVERSITY OF CALIFORNIA AT LOS ANGELES - COMPUTER SCIENCE DEPARTMENT (1971 - 1972)

Description of Programme:

This is a computer science-oriented curriculum which includes four basic areas. Theory includes theoretical models in computer science; automata theory; formal grammars; computability and decidability; pattern recognition; automatic deduction; and queuing theory. Methodology includes simulation; information storage and retrieval; file management; numerical analysis; optimization; and analog and hybrid computers. System design includes computer system architecture; digital systems; logic design; memory, arithmetic, control, data transmission and input/output systems design; and computer graphics. Programming languages and systems include general and special purpose programming languages; compilers; system programming; syntax; semantics and pragmatics of programming languages.

Information Science Courses: (credit in quarter hours)

Information Processing Systems (4)
Basic Structures for Data Representation (4)
Theoretical Models in Computer Science (4)
Interfacing Digital Computers with External Systems (4)
Programming Languages and Systems (4)
Compiler Construction (4)
Systems Programming (4)
Heuristic Programming and Artificial Intelligence (4)
Continuous Systems Stimulation (4)
Advanced Topics in Programming Languages (4)
Pattern Recognition (4)
Data Management Systems (4)
Computers, Science and Society (4)
Data Transmission in Computer Systems (4)

no changes 1972-1973

CORNELL UNIVERSITY - DEPARTMENT OF COMPUTER SCIENCE (1971 - 1972)

Description of Programme:

At Cornell, computer science is concerned with fundamental knowledge in automata, computability, and programming languages and systems programming, as well as with subjects such as numerical analysis and information processing which underlie broad areas of computer applications. Because of wide implications of research in the field, the Department of Computer Science is organized as an intercollege department in the College of Arts and the College of Engineering.

Information Science Courses: (credit in semester hours)

Introduction to Computer Systems and Organization (4)
Advanced Computer Programming (4) (Not offered in 1971-1972)
Data Structures (4)
Programming Languages (4)
Translator Writing (4)
Systems Programming and Operating Systems (4)
Information Organization and Retrieval (4)
Theory of Automata I (4)
Theory of Automata II (4)
Formal Languages (4)

Picture Processing (4)
Seminar in Programming (4)
Seminar in Information Organization and Retrieval (4)
Seminar in Automata Theory (4)
Digital Systems Simulation (3)
Data Processing Systems (3)

no changes 1972-1973

UNIVERSITY OF HOUSTON - COMPUTER SCIENCE DEPARTMENT (1971 - 1972)

Description of Programme:

The Master's programme emphasizes basic ground in computer science with opportunities to specialize in programming languages, large-scale information systems, artificial intelligence, numerical analysis, automata theory, and computer architecture. It may appropriately be described as a computer-oriented curriculum.

Information Science Courses: (credit in semester hours)

Computer Organization and Programming (3)
Information Structures (3)
Programming Problems (3)
Structure of Programming Languages (3)
Computer and Programming Systems (3)
Introduction to Automata Manipulation (3)
Information Storage and Retrieval (3)
Large Scale Information Systems (3,3)
Theory of Automata (3)
Language and Processors (3)
Formal Languages (3)
Introduction to Computer Science (3)
Introduction to Logic and Computing Machines (3)

no changes 1972-1973

UNIVERSITY OF MARYLAND - COMPUTER SCIENCE CENTER (1971 - 1972)

Description of Programme:

The University of Maryland programme is a computer science-oriented programme which emphasizes both the theoretical and applied sides. At present the programme is a graduate programme only, offering both a Master's and Doctor's degree. It consists of five areas of specialization, which are as follows: theory of computing, language and information processing, computer systems, numerical methods, and applications.

Information Science Courses:

Language and Structure of Computers (no graduate credit)
Introduction to Computer Languages and Systems (no graduate credit)
Introduction to Discrete Structures (no graduate credit)
Computer Organization (3)
Data and Storage Structures (3)
Structure of Programming Languages (3)
Programming Systems (3)
Computer Systems (3)
Information Processing (3)
Computability and Automata (3)

Translation of Programming Languages (3)
Information Retrieval (3)
Computational Linguistics (3)
Mathematical Linguistics (3)
Artificial Intelligence (3)
Computer Processing of Pictorial Information (3)
Topics in Information Science (3)
Automata Theory (3)
Theory of Formal Languages (3)
Theories of Information (3)
Advanced Automata Theory (3)

UNIVERSITY OF MARYLAND - COMPUTER SCIENCE CENTER (1972 - 1973)

Information Science Courses:

add

Topics: Pattern Recognition
Topics: Data Communications
Topics: Questions-Answering Systems

delete

Computability and Automata
Automata Theory
Advanced Automata Theory

revise

Introduction to Computer Languages and Systems

MASSACHUSETTS INSTITUTE OF TECHNOLOGY - ELECTRICAL ENGINEERING DEPARTMENT(1971-1972)

Description of Programme:

The programme is computer science-oriented. Important areas of study include: computer systems, artificial intelligence, structures of computations, and automata theory. Considerable emphasis is placed on original research. The graduate programme does not have specific subject requirements except for thesis. Students are encouraged to formulate their own programme of study with the help of a faculty counselor.

Information Science Courses:

COMPUTER PROGRAMMING AND SYSTEMS

Information Systems (12)
Digital Computer Programming Systems (12)
Programming Linguistics (12)
Principles of Programming Languages Processors (12)
Structure of Computer Systems (12)
Advanced Computer Systems (12)
Management Information Systems (9)
Issues in Information System Design (9)

SIGNAL PROCESSING

Circuits, Signals and Systems (12)
Introduction to Signal Processing (12)
Digital Processing of Signals (12) (graduate A subject)
Image Processing (12) (graduate A subject)
Pattern Recognition (12)

AUTOMATA THEORY AND FORMAL LINGUISTICS

Theoretical Models for Computation (12)
Formal Language Theory (12) (graduate A subject)
Advanced Topics in Language and Automata Theory (arranged) (graduate A subject)
Mathematical Models in Linguistics (12)

PROBABILITY AND INFORMATION THEORY

Probabilistic Models in Systems Engineering and Operation Research (graduate A subject)

Transmission of Information (12) (graduate A subject)

ARTIFICIAL INTELLIGENCE

Introduction to Artificial Intelligence (12)
Heuristic Programming and Artificial Intelligence (12)
Mathematical Topics in Artificial Intelligence (arranged) (graduate A subject)
Topics in Artificial Intelligence (arranged) (graduate A subject)
Mathematical Learning Theory (12) (graduate A subject)

PHILOSOPHY AND LINGUISTICS

Semantics (12) (graduate A subject)
Introduction to Linguistics I : Syntax (24)
Introduction to Linguistics II: Theory of Grammar (12)
Logic and Language (12) (graduate A subject)
Semantics (12) (graduate A subject)

no changes 1972-1973

MCGILL UNIVERSITY - GRADUATE SCHOOL OF LIBRARY SCIENCE

405-632a. LIBRARY APPLICATIONS OF DATA PROCESSING I

This study/project course is intended to give the student practical experience of the problems of EDP applications in libraries. The students receives practical instruction in programming and planning for automated systems; the project involves the study or design and testing of an automated library routine.

Background

Introduction to systems analysis and flowcharting techniques. Introduction to computer hardware and software (for students who have not taken Introduction to Data Processing).

Programming for library routines

Binary arithmetic and machine language; high level languages. Boolean algebra, queueing theory. Survey of FORTRAN, COBOL, ALGOL, PLI, SNOBOL.

Exercise

Write a short programme for a simple operation (e.g. locate a word in a title).

Case studies in automation

Studies in individual and integrated automated routines in Canada, US, and UK.

Group projects

Critical analysis OR design and testing of an automated routine.

SCHOOL OF LIBRARY AND INFORMATION SCIENCE - GENESEO - STATE UNIVERSITY OF NEW YORK

Core Courses required of all students

Lib 500 THE LIBRARY IN THE CHANGING SOCIETY

A study of the basic socio-political environment and selected conceptual approaches that illustrate the structural development of libraries and information systems. Theoretical generalizations extracted from the social and behavioural sciences are utilized to describe the role of libraries in society as agents of information, communication, and dissemination. Some emphasis will be placed on the professional preparation and responsibilities of librarians; and on some of the problems, issues, and opportunities facing libraries and librarians in this age of accelerating change, explosive ideas, continuous experimentation, and technological innovation, with an introduction to the literature of librarianship.

Lib 501 INFORMATION AND INFORMATION RESOURCES

An introduction to the basic philosophical properties of information, its structure, and significant models of information storage and retrieval. The course centres upon bibliographic organization and information control, giving some attention to traditional library materials and resources, as well as general reference works.

Lib 502 PRINCIPLES OF LIBRARY MANAGEMENT AND AUTOMATION

Introduction to contemporary theories and practices of library management. Emphasis is placed on problems and ideas common to all types of libraries and information centres. Some of the areas investigated are the historical, legislative, and statistical background to library and information management, and general principles of management and systems analysis and design, as applied to contemporary library operations. In the second part, theoretical and practical aspects of automation of certain procedures in library and information centre management are discussed, covering data recording in machine processable form and the hardware used in punched card data processing departments.

Lib 503 ORGANIZATION AND CLASSIFICATION OF KNOWLEDGE

This course is designed to introduce the student to the principles underlying the organization of knowledge, as applied to library materials and their presentation in the catalogue, to create awareness of the problems involved and the various solutions that have been proposed, and to examine the more widely used methods and traditional practices. Among the topics to be considered are classification schemes, both enumerative and faceted, alphabetical and classified catalogues, cataloguing codes, filing rules, and the use of printed cards. The Dewey Decimal and Library of

Congress classification schemes, Library of Congress and Sears subject heading lists and the Anglo-American Cataloguing Rules, will be examined as examples of systems in use; and recent trends and developments will also be discussed.

Lib 504 FUNDAMENTALS OF INFORMATION STORAGE AND RETRIEVAL

An introduction to the conceptual and intellectual aspects of information storage and retrieval. Problems of language, semantics and syntax are discussed, with special attention to concepts of artificial languages. The course covers contemporary storage media and the general characteristics of theoretical and physical processes of storage and retrieval, with special emphasis placed on the following topics: thesaurus structure and development; coding of information; organization of information for efficient retrieval, problems of storage; search criteria-search strategy; and semi-automatic and automatic systems of storage and retrieval. Computer applications.

SCHOOL OF LIBRARY SCIENCE - CASE WESTERN RESERVE UNIVERSITY - CLEVELAND - USA

Courses of Instruction

500. Foundations of Library Science (6). A consideration of the basic principles and concepts which form a necessary basis for the study and subsequent practice of all types of librarianship. Prerequisites to all other courses. Offered only in Summer and Fall sessions.

501. Seminar in American Library History (3). An overview of American library history with emphasis on the sociological background, European origins, and the relation of the writing of library history to the writing of history in general. Lectures and discussions. (Not offered 1970-71).

502. Books and Libraries: Problems of Historical Interpretation (3). An attempt to analyze and interpret important events in the history of books and libraries, and to inquire into their pertinence for our times.

503. The Library in the Community (3). The public library as a basic adult education institution; study of the community; relations with other institutions; community services; methods of working with individuals and groups.

512. Special Libraries (3). An introduction to the management and operation of special libraries. Students will receive practice in developing patterns of service to meet the needs of specialized user groups.

514. Hospital Library Service (3). Orientation in the field organization and techniques which apply to different types of hospitals, institutions, and public library extension services; special emphasis on bibliotherapy and the library's contribution to rehabilitation. Field assignments are included.

516. College and University Libraries (3). Library service in relation to the problems of modern higher education, with emphasis on organization and administration, personnel, collections, buildings and services.

517. Public Library Administration (3).
(...)

518. Public Library Systems (3).
(...)

521. Information Sources and Services (3). Study of the basic general and subject oriented bibliographic tools and other reference literature with which a library gives information and reference service.

524. Introduction to Information Science (3). Designed to familiarize students not in the information science programme with the subject content, orientations, methodologies and major works in information science. Emphasis is on surveying the research literature; the practical aspects of information retrieval, including the application of information technology; and examing the relationships to librarianship.

525. Materials Selection (3). Principles of selection and evaluation of books and non-book materials, with emphasis on the needs and interests of the adult user. There will be two sections: one directed to the needs of the public library and the other to the needs of the academic library.

527. Government Documents (3)

(...)

529. Research in Librarianship (3). An introduction to the fundamental aspects of reflective inquiry and the methods and techniques of research applicable to librarianship. Required of all doctoral students.

530. Field Work (3)

(...)

535. Archives and Historical Manuscript Collections (3)

(...)

537. Organization and Cataloguing of Library Collections (3)

(...)

538. Advanced Cataloguing and Classification (3). Further study of library classification systems and subject cataloguing, the organization of information, and consideration of special problems.

540. History and Theory of Classification (3). Historical development of the theories of the organization of knowledge and their influence upon systems of library classification (not offered 1970-71).

554. Organization of Service to Children (3).

(...)

555. Children's Literature (3).

(...) Survey course.

556. Children's Literature (3).

(...)

557. Elementary School Library Media Centre Materials and Methods (3).

(...)

559. Group Work with Children (3).

(...)

561. Secondary School Library Media Centre Materials and Methods - Part 1 (3).

(...)

562. Secondary School Library Media Centre Materials and Methods - Part 2 (3).
(...)

563. Introduction to Non-Print Instructional Materials in School Library Media Centres (3).
(...)

564. Administration of School Library Media Centres - Part 1 (3).
(...)

565. Administration of School Library Media Centres - Part 2 (3).
(...)

567. School Library Media Systems Supervision (credit as arranged).
(...)

571. Computer Programming for Information Retrieval (3). Basic programming concepts. Problems in retrieval and evaluation will be programmed and run on the UNIVAC 1108. Emphasis will be on practical laboratory work and gaining programming experience rather than on programming theory.

572. Automation of Library Processes (3). Survey, analysis, and evaluation of the uses of data processing equipment for the performance of library functions.

573. Information Retrieval Systems (3). Study of the environment, purpose, structure and operations of information retrieval systems. Includes communication processes; user studies and relevance; functions of acquisition, information representation, file organization, question analysis and searching, and dissemination; performance studies; relations to library systems.

574. Information Retrieval Systems Laboratory (3). Selected experimental and theoretical work in relation to environment and components of retrieval systems is synthesized and critically examined. Methodologies for test and evaluation; test results. Experiments are designed and executed by students in a laboratory setting, utilizing previous experimental work in the field. Generalizations to libraries, library practice and library processes.

575. Information Processing on Computers (3). Historical review of computer developments, functions performed, and organization of computers. Punched card systems and stored-programme computers surveyed in terms of information retrieval, scientific and business parameters. Principles of programming, systems organization, and symbol manipulation, with emphasis on application of high speed computers.

576. Automatic Language Processing (3). Survey of computational linguistics and statistical approaches to processing text with emphasis on their application to information retrieval systems.

577. Introduction to Information Retrieval Theory (3). An elementary treatment of certain mathematical tools needed in the construction of abstract theories and models in the field of information retrieval. Application of these tools to the design and evaluation of retrieval systems.

578. Specialized Information Centres and Services (3). Special libraries, information analysis centres, indexing and abstracting services, and document distribution agencies, showing their purposes, functions and organizational characteristics.

579. Computers in the Humanities (3). Computer processing of non-numeric information. Survey of current use of computers for research in the humanities. mphasis is on what types of work can be computerized rather than on specific techniques. Scope includes language and literature, religion, philosophy, music, visual arts, history and allied subjects, archaeology, anthropology, classics and museum networks

580. Special Studies (Credit as arranged). Independant research in some area of librarianship or documentation which especially interests the qualified student (...) The University computing facilities are available for the running of problems.

582. The Library in the Social Revolution (3). A seminar designed to explore the characteristics and the information needs of our society, particularly in regard to disadvantaged neighbourhoods and sub-communities, urban and rural; to work toward a redefinition of the library as a social institution; to evaluate criteria for programmes and materials; and to consider the effect of the social revolution on library manpower and the investment of community support in local activities.

584. Information Sources and Services in Science and Technology (3).
(...)

586. Information Sources and Services in the Humanities (3).
(...)

588. Information Sources and Services in the Social Sciences
(...)

590. Introduction to Law Librarianship (3).
(...)

592. Introduction to Medical Librarianship (3).
(...)

594. Introduction to Music Librarianship (3).
(...)

596. The Nature, Collection, and Handling of Historical Materials (3).
(...)

598. Organization of Medical Practice and Research (3).
(...)

599. Medical Subject Analysis and Searching (3).
(...)

601. Directed Reading (Credit as arranged). Intensive reading and consultation with the instructor in an area of librarianship representing the student's field of concentration, in preparation for the General Examination. Required of doctoral students with the consent of the instructor. Successful completion of this course is a prerequisite to admission to the General Examination in Library Science.

611. Mathematical Methods for Information Science (3-6). A survey of mathematical tools which have applications in information science.

612. Idem. A continuation of 611.

620. Seminar in Library Education (6) (...). The course requirements include a practicum during which each student will teach a unit in a scheduled course in the master's programme in library science.

629. Seminar for Doctoral Students (Credit as arranged). Research seminar (...). Required of all doctoral students.

640. Theory of Classification. Part 1 (3). Seminar in advanced classification theory with emphasis on non-conventional classification theory, systems and rationale. Students will experiment with systems of their own creation. Discussion of generalized field theories.

641. Theory of Classification, Part 2 (3). Continuation of 640.

651. Children's Literature Reference Sources (3).
(...)

652. Publishing for Children (3).
(...)

653. Children's Book Illustration (3)
(...)

671. Computer Design of Information Systems (3). The role of computers in the design of information systems; analysis of typical problems, and application of scientific techniques.

672. Modelling in Library and Information Science (3). The use of models in scientific research. Models of communication processes and their application in the design of information systems.

673. Systems Analysis in Information Science (3). The basic concepts of systems theory are presented and applied to the design and analysis of information systems.

674. Self-organizing Systems (3). The design and use of heuristic programmes in game playing, problem solving, and question answering, emphasizing the implications of artificial intelligence in information science.

EXAMPLES OF LIBRARY-ORIENTED CURRICULA

1. Case Western Reserve University - School of Library Science (computer science- and library-oriented) 70/71

2. University of California at Berkeley - School of Librarianship 71/72 72/73

3. University of California at Los Angeles - Graduate Training Programme in Medical Librarianship 71/72/73

4. University of Chicago - Graduate Library School 71/72

5. The Polytechnic of North London - School of Librarianship

6. School of Library, Archive and Information Studies - University College London

7. Newcastle upon Tyne Polytechnic - Dept. of Librarianship

8. University of British Columbia - School of Librarianship

UNIVERSITY OF CALIFORNIA AT BERKELEY - SCHOOL OF LIBRARIANSHIP (1971-1972)

Description of Programme:

The programme is basically oriented towards two major problem areas: fundamental conceptual problems of information storage and retrieval, drawing on logic, mathematics, and linguistics; and the application of computer technology to bibliographical and library problems. It is both theoretically and library-oriented.

Information Science Courses: (credit in quarter hours)

Introduction to the Information Sciences (3)
Theoretical Problems in Information Transfer and Retrieval (4)
Formal techniques for Intellectual Access (2 x 4)
Automatic Data Retrieval and Question-Answering (3)
Measures of Retrieval Effectiveness (3)
Using Computers in Advanced Bibliographic Research (3)
Introduction to Library Systems Analysis (4)
Library Systems Analysis (4)
Data Processing for Libraries (3)
Survey of Library Automation (4)
Interlibrary Co-operation and Information Networks (3)

UNIVERSITY OF CALIFORNIA AT BERKELEY - SCHOOL OF LIBRARIANSHIP (1972-1973)

Description of Programme:

idem

Information Science Courses: (credit in quarter hours)

add: Library User Studies (3)
Interlibrary Co-operation and Information Networks (3) (new n°)
Bibliographic Records in Machine Form (3)
Economics of Information (3)
Social and Personal Implications of Information Technology (3)

UNIVERSITY OF CALIFORNIA AT LOS ANGELES - GRADUATE TRAINING PROGRAMME IN MEDICAL LIBRARIANSHIP (1971 - 1972)

Description of Programme:

Recent graduates of accredited library schools, or those with a Master's degree in a related area of information science, are equipped for positions at the middle level of responsibility in larger health science libraries and information centres or for full responsibility in smaller libraries. Trainees are given firsthand acquaintance with all operations characteristic of health science libraries so that they can determine the area or areas in which they function best and at the same time gain an appreciation of the way in which the various areas fit together for a successful whole. Trainees are stimulated to acquire permanent patterns for keeping abreast of new developments in science information work so that they will be alert in their future careers for opportunities to apply innovations and, where abilities and interests coincide, to seek chances to investigate on their own.

Information Science Courses:

Information Systems Analysis and Design
Management Information Systems
Data Base Systems
Data Processing in the Library
Health Science Library Internship

no changes 1972-1973

UNIVERSITY OF CHICAGO - GRADUATE LIBRARY SCHOOL (1971 - 1972)

Description of Programme:

Various courses related to information science, broadly defined, are offered within the context of a programme in librarianship. The library school has no designated or separate programme, as such in information science. The study of users and audiences, and the planning of systems and networks of libraries and information services receive emphasis. A separate degree programme, more advanced in its mathematical level, is offered by the Committee on Information Sciences. The courses which it offers may be taken for credit in the Graduate Library School.

Information Science Courses:

Library Systems Planning I
Library Systems Planning II
Basic Mathematics for Information Science
Language, Symbolic Processes, and Computers
Managerial Systems Analysis
Theories of Indexing and Information Retrieval
Science of Communications
Mechanical Translation and Language Processing
Information Storage and Searching
Seminar: Research Methods in Information Retrieval
Problems in Library and Personal Information Processing
Communication Among Scientists
Quantitative Research Methods
Operations Research for Libraries

no further information on 1972-1973

THE POLYTECHNIC OF NORTH LONDON - SCHOOL OF LIBRARIANSHIP

Post-graduate course - University of London
Diploma in Library and Information Studies

Compulsory Subjects

1. Bibliographic organization
2. Organization of knowledge (cataloguing and classification)
3. Library management

Optional Subjects

11. History of Libraries I: general
12. History of Libraries II: classical period
13. History of Libraries III: modern period
14. Historical bibliography I: general
15. Historical bibliography II: period studies
16. Manuscript material in libraries I: introductory
17. Manuscript material in libraries II: general
18. Librarianship of British local history
19. Modern book production
20. Reprography (microcopy, photocopy, duplicating ...)
21. Hospital and medical librarianship
22. Children's reading and its development
23. Work with children in public libraries
24. School libraries
25. Studies in communications I: psychology of reading
26. Studies in communications II: literacy and popular culture
27. Introduction to administrative theory
28. Use of statistics in libraries
29. Research methods in librarianship
30. Comparative librarianship
31. Advanced indexing and retrieval
32. Communication in science I
33. Communication in science II
34. Individual study in an approved topic

Degree Course

(A) The 'Universe of knowledge' and subject study.

The object of this new area of study (which has been developed by a teacher at this school) is to survey the nature and structure of the whole universe of knowledge. It is included as a valuable contribution to general education and as a prerequisite to effective organization and dissemination of knowledge through classification, book selection, and reference work.

Part I: the student considers knowledge as a whole, examining relevant disciplines such as epistemology, the growth of knowledge and the attempts made to form an integral view.

Part II offers the choice of one of several subjects for more detailed study. Subject bibliography and other aspects of the course can be closely related to the choice made. The subjects are:

Biology
Chemistry
Children's Literature
English Local History
Literary Studies (English Literature)
Music

(B) Social Studies

The intuition here is to demonstrate the interaction between society and library services. Part I offers a broad study of the major social institutions in Britain today and introduces certain concepts used in the social sciences. Part II allows the student to examine in some detail the relationship between particular communities and the appropriate library services.

(C) Communication Studies

Part I begins by surveying the contributions made to the study of communication by such disciplines as semantics, philosophy, psychology and information theory, assessing their relevance for librarians. This is followed by a course introducing the major systems of communication and control in society, with particular reference to those which have been developed for recorded and documentary communication.

Part II provides for further study of certain aspects of the above which are of special importance for the librarian, namely: library management, bibliographic organization, and indexing systems.

(D) Complementary Studies

Courses in mathematics and logic, and the study of a foreign language with particular reference to the needs of libraries are included in Part I.

In Part II a choice is made from the following:

Studies in printed communications
Literature and society
Library history
Descriptive bibliography and bibliographical cataloguing
Palaeography and the use of original documents
Personnel administration
(one to be chosen)

SCHOOL OF LIBRARY, ARCHIVE AND INFORMATION STUDIES - UNIVERSITY COLLEGE, LONDON

Librarianship Studies
Diploma in library and information studies

The Diploma course consists of lectures, group work, tutorials and seminars, demonstrations, and visits to libraries, presses, and other professional and commercial organizations. In addition, each student normally undertakes two weeks of practical work on the staff of appropriate libraries, under arrangements made by the School.

Details of courses and examinations

1. Historical studies in librarianship
2. Historical bibliography
3. Subject bibliography - research sources in general and special fields
4. Cataloguing
5. Classification
6. Management studies and statistical methods in library and information work
7. The study of reading

8. One of the following:
   a) Palaeography and Diplomatic of English Archives
   b) Oriental and African Bibliography
   c) The Literature of Pure and Applied Science: communication problems, information systems
   d) Printing and Book Production
   e) Manuscript Studies

Special lectures

Course and examination in scientific and industrial library and information work.

1. The literature of pure and applied science: communication problems, information systems;
2. The history of modern library and information services;
3. Subject bibliography: research sources and special fields;
4. Surveys and use of scientific literature;
5. Classification
6. Cataloguing
7. Modern pringing methods
8. Management studies and statistical methods in library and information work

Archive Studies
Diploma in Archive Studies

I. Basic Instruction

1. Record Office Management
2. Records Management
3. Preparation of Finding Aids
   The making of lists, catalogues, calendars, etc. Post-mediaeval documents only.

II. Optional Subjects

4. Administrative History, English, early.
5. Administrative History, English, modern
6. Administrative History, Overseas. After lectures on the history and records of such bodies as the Colonial Office, Commonwealth Relations Office, and missionary and trading societies in general, students are sent individually to specialists in the history of their own area for further instruction.
7. Reading and Interpretation of Documents, English, Mediaeval.
8. Reading and Interpretation of Documents, English, modern.
9. Reading and Interpretation of Documents, foreign languages.
10. Description of Mediaeval Records.
11. The Law of Real Property
12. Local Government Organization
13. Historical and Bibliographical Sources, England and Wales.
14. Historical and Bibliographical Sources, Overseas.
15. The History and Development of Company Law and Accounting.
16. The History and Literature of Science and Technology.
17. Information Studies. Incl. the use of computers.

NEWCASTLE UPON TYNE POLYTECHNIC - DEPARTMENT OF LIBRARIANSHIP

A. COMPULSORY SUBJECTS

1. The Library in Society
2. The sociological background and contemporary and future roles of and developing attitudes to libraries in a changing society
3. The management of libraries
4. Classification and Cataloguing
5. Subject Bibliography

B. OPTIONAL SUBJECTS (two to be taken)

7. History of Libraries
9. Modern Book Production
10. Indexing, Abstracting and Information Retrieval. A detailed study of these increasingly significant subjects, including mechanical and electronic methods.
11. Bibliography and Librarianship of Children's Literature
12. Library Service for Young People
17. Library Services to Science and Technology
18. Literature and Librarianship of local history

These subjects are studied as an integrated course and may not be taken separately.

SCHOOL OF LIBRARIANSHIP - UNIVERSITY OF BRITISH COLUMBIA - VANCOUVER - B.C.

The purpose of the new programmes is to prepare students to deal effectively with the problems that present themselves in the administration, design and operation of library services. To provide such preparation, the programmes will devote the first year to a sequence of required courses covering those aspects of professional knowledge which should be common to all librarians. In the second year, students will build on this core by specialized studies relevant to their particular background and proposed direction of professional development. In most instances, the second year will combine studies within librarianship proper with those in other university departments. As fields such as statistics, computer science, public administration etc. impinge directly on important aspects of librarianship, students should have the opportunity of taking courses in those areas. Moreover, in line with the growing requirement for librarians to serve as literature specialists and subject bibliographers, it is desirable that students have the chance to take more courses in other departments so as to reinforce their subject knowledge (...).

The work of the First Year consists of courses representing the knowledge that should be common to all librarians and providing a foundation for the specialized studies of the Second Year.

In the Second Year, the student, by choice of courses, seminars, directed studies and individual research projects, concentrates his work in one or more of the four main areas of specialization. He is required to take the course in Research Methods; the other courses are chosen under the guidance of his adviser from courses offered in the School and by other departments of the University.

The usual plan of work for the Second Year will encompass the following:

a) three courses in one of the groups A-D;
b) one course from group E designated to relate his specialization to a given type of library;

c) four courses from other departments of the University, designated to relate his library interests to a given subject field;
d) one course from group F - advanced seminar, directed study or individual research project;
e) research methods in librarianship.

The above plan can be modified in the light of the student's background and interests.

GROUP A - BIBLIOGRAPHY AND INFORMATION SERVICES

- Resources in the Arts and the Humanities
- Resources in the Social Sciences
- Resources in Science and Technology
- Services for Adult Readers
- Services for Children
- Services for Young People
- Services to the Disadvantaged

GROUP B - LIBRARY MATERIALS

- Literature for Children
- Literature for Young People
- Non-Book Materials
- Archives and Manuscripts
- Rare Books and Special Collections
- Government Publications

GROUP C - DOCUMENTATION AND TECHNICAL SERVICES

- Documentation
- Special Problems in Documentation
- Advanced Cataloguing and Classification
- Special Classification Systems
- Organization of Library Technical Services
- Automation of Library Systems
- Planning and Design of Libraries

GROUP D - FOUNDATIONS

- History of Librarianship
- History of the Book
- Canadian Libraries and Librarianship
- Comparative Librarianship
- Education for Librarianship

GROUP E - LIBRARY ADMINISTRATION - TYPES OF LIBRARIES

- College, University and Research Libraries
- Public Libraries
- School Libraries
- Special Libraries and Information Centres
- Medical Libraries

GROUP F - RESEARCH AND INDIVIDUAL STUDY

- Advanced Seminar
- Directed Study
- Individual Research Project
- Research Methods in Librarianship

EXAMPLES OF SYSTEM-ORIENTED CURRICULA

1.	University of Kentucky - College of Library Science	71/72/73	
2.	Ohio State University - Dept. of Computer and Information Science	71/72	72/73
3.	Stanford University - Dept. of Communication	71/72	72/73

UNIVERSITY OF KENTUCKY - COLLEGE OF LIBRARY SCIENCE (1971 - 1972)

Description of Programme:

The programme possesses a system orientation emphasizing the methodology of systems analysis and design as it applies to the library/information centre context. The curriculum includes the analysis and design of library systems, evaluation of library systems, determination of user needs, library automation, information storage and retrieval and other related topics. Emphasis is on the operational and service needs of libraries and users.

Information Science Courses: (credit in semester hours)

Introduction to Information Science (3) - Introduction to major areas of information areas of information science and technology. Consideration is given to the nature of information science and technology as a field of study, the analysis and design of information systems, basic computer systems, and specific components of information storage and retrieval systems.

Automation and the Library (3) - Introduction to the theory and practice of automation and its implications and applications to libraries. A survey and evaluation of electronic and other automated systems for document processing in libraries.

Library Systems Analysis (3)

no changes 1972-1973

OHIO STATE UNIVERSITY - DEPARTMENT OF COMPUTER AND INFORMATION SCIENCE (1971 - 1972)

Description of Programme:

The Department of Computer and Information Science is a separate academic unit in the College of Engineering, operating in part as an interdisciplinary programme with the co-operation of many other departments and colleges throughout the University. Its programme emphasizes education, research, and the professional practice and application of computer and information science.

The philosophy and orientation of this programme can be obtained from the following definition of computer and information science. Computer and information science deals with the body of knowledge concerned with the quantitative relationships, concepts, theory, and methods common to the processing and utilization of information, and with the theory and operation of the systems with process information. The study of both natural and artificial languages as modes of communication and of natural and artificial systems which process information is fundamental to computer and information science. Common properties of information are induced logically by the study of specific systems and specific areas of science and technology which have a concern with the handling of information. Information is defined as data of value in decision-making.

Information Science Courses: (credit in quarter hours)

Engineering Psychology (3)
Digital Computer Programming III (5)
Man-machine Interface (5)
Introduction to Linguistic Analysis (5)
Basic Concepts of Self-Organizing Systems (3)
Theory of Automata I (3)
Theory of Automata II (3)
Theory of Automata III (3)
Basic Concepts in Artifical Intelligence (5)
Computer Systems Programming (5)
Modern Methods of Information Storage and Retrieval (5)
Fundamentals of Document-Handling Information Systems (3)
Analysis and Synthesis of Information Systems (3)
Theory of Indexing (5)
Language Processing for Information Storage and Retrieval (5)
Programming Languages (5)
Compiler Design and Implementation (5)
Selected Topics in the Mathematics of Information Handling I and II (3 + 3)
Digital Signal Processing (3)
Theory of Management Information Systems (5)
File Structures(3)
Intermediate Studies in Computer and Information Science (1-5)
- Theory of Information
- Information Storage and Retrieval
- Theory of Automata
- Artificial Intelligence
- Pattern Recognition
- Computer Systems Programming: Basic Telecommunication and Access Methods
- Man-Machine Interaction
- Management Information Systems
- Socio-Psychological Aspects of Information Processing

Information Theory in Physical Science (3-5)
Information Theory and Models of Natural Complex Systems (3-5)
Advanced Engineering Psychology (Special Section) (3)
Computational Linguistics (3)
Pattern Recognition (3)
Theory of Information Retrieval I (5)
Theory of Information Retrieval II (3)
Formal Languages (5)
Seminar on Socio-Psychological Aspects of the Inf. Sciences (3)
Advanced Studies in Computer and Information Science (1-5)
- Theory of Information
- Information Storage and Retrieval
- Theory of Automata
- Artificial Intelligence
- Pattern Recognition
- Computer Systems Programming
- Programming Languages
- Man-Machine Interaction
- Formal Languages
- Management Information Systems
- Socio-Psychological Aspects of Information Processing.

OHIO STATE UNIVERSITY - DEPARTMENT OF COMPUTER AND INFORMATION SCIENCE (1972 - 1973)

Description of Programme:

idem

Information Science Courses: (credit in quarter hours)

add:
- Linear Optimization Techniques in Inf. Processing (5)
- Introduction to Computer and Inf. Science (5)
- Information Theory in Behavioural Science (3)
- Statistical Methods in Pattern Recognition (5)
  - Formal Languages (1-5)
  - Biological Information Processing (1-5)
- Computer and Inf. Sc. Research Methods (4)
- Design and Analysis of Inf. Systems Simulations (3)
  - Formal Languages (1-5)
  - Management Information Systems (1-5)
  - Biological Information Processing (1-5)
  - Socio-Psychological Aspects of Inf. Processing (1-5)

delete:
- Basic Concepts of Self-Organizing Systems
- Selected Topics in the Mathematics of Information Handling II

revise:
- Human Performance (formerly Engineering Psychology)
- Computer Systems Programming I (formerly Digital Computer Programming III)
- Techniques for Simulation of Information Systems (formerly Analysis and Synthesis of Inf. Systems)
- Cellular Automata and Models of Complex Systems (formerly Inf. Theory and Models of Natural Complex Systems)
- Human Performance Theory (formerly Advanced Engineering Psychology)
- Special Topics in Pattern Recognition (formerly Pattern Recognition)

STANFORD UNIVERSITY - DEPARTMENT OF COMMUNICATION (1971-1972)

Description of Programme:

Training for scientists who will develop and implement new information systems to utilize the potential of new communication technology for medical information systems, education, and other desirable social goals. There are three major segments of this programme: (1) behavioural science research, (2) computer science, (3) social institutions.

To be effective, information systems require adaptation to both the information needs and information-seeking behaviour of the intended users. For large-scale systems to be effective, technology must be attuned to the human users, not vice-versa. Much behavioural research will be required to develop information technology into an effective man-machine symbiosis. Information technology cannot provide satisfactory media to aid human communication unless the psychological processes of both the sender and the receiver are considered.

The second component of the programme is computer science. Computerized information media will require major advances in both software and equipment. Students in the programme should become skilled in systems programming so they can participate effectively in the design and development of information systems and networks involving computer and other media.

The third component concerns the analysis of social institutions, procedures and policies concerning communication. It should be obvious that information systems are not instituted in an economic and a social vacuum. Knowledge of resources, social priorities, government regulations, and the nature of existing information media and institutions will be necessary in order to accomplish a transition to future systems.

Information Science Courses: (credit in quarter hours)

Theory of Communication I (4-6)
Theory of Communication II (4-6)
Theory of Communication III (4-6)
Communication Research Methods I (4)
Communication Research Methods II (4)
Introduction to Information Science (3) - Techniques for describing the organization, utilization, and growth of data collections whether stored in the mind, in society, or in computers.
Flow of Information among Scientists (3)
Flow of Scientific and Technical Information to the Public (3)
Computer Information Systems (3)
Advanced Communication Theory and Method Seminar I (3)
Advanced Communication Theory and Method Seminar II (3)
Advanced Communication Theory and Method Seminar III (3)
Advanced Data Analysis (4)

STANFORD UNIVERSITY - DEPARTMENT OF COMMUNICATION (1972-1973)

Description of Programme:

(add paragraph)

There is also a biomedical communication option with financial support provided from a training grant from the National Library of Medicine.

Methods as described in various curricula

School of Librarianship - The Polytechnic of North London

(...) Our courses are founded on the assumption that the student at the end will have an over-all view of libraries and librarianship, their place in society, their value to a given community and the means he must employ to carry out his professional services. To achieve this end we not only teach the techniques of bibliography and librarianship, but attempt to foster a professional attitude and individual judgement. It is essential for the student to think for himself and to work without constant supervision (...).

Teaching Methods

Methods of study will not be confined to formal lectures. Small seminar groups and tutorials will be provided to ensure that each individual student has opportunities within the general framework of the course to deal with problems which are not easily discussed in lectures. In addition, the School will organize visits to libraries and periods of practical work in libraries. Students of bibliography and book production will be given practice in hand composition and printing in the School's Press Room.

Each member of the School's teaching staff will also be responsible for the supervision of all the studies of a small group of students and will be available for consultation on any matter concerning the general welfare of each student in his tutorial group (...).

The University of Western Ontario - London - Canada

(...) A distinctive feature of the School of Library and Information Science at the University of Western Ontario is that, in keeping with graduate work, it operates on a seminar system rather than through lectures and the giving and testing of basic information and facts in the classroom. In the School, fact-finding and some interpretation of the facts is done in advance of any seminar session. As far as can be, the preparatory studies are from primary sources or from experience in laboratory-type investigations. Seminar sessions are then fully given over to the ideas and queries which arise from the preparatory studies as well as to the contributions which, through reliance on primary sources, students are able to make on their own and in co-operation with the faculty. In such ways students and faculty can enjoy the stimulation that comes from contributing to well planned seminars; and from experience with the method both groups very much prefer it to the traditional lecture system. The development is in keeping with current trends in professional education; it is appropriate to a mature student body.

As a rule in large seminars, a team of four students is given special responsibility for seminar preparation and leading the discussion. The team meets with the instructor in advance of any session and, after briefing, carries out its research. Before the classroom meeting there is a further conference with the instructor to ensure that the ground has been covered adequately and that all ideas are sound. The small conferences are one device by which quality is guaranteed in the School's professional studies. In the seminar room the team sits beside the instructor and so, formally, shares in the conduct of the session. At the same time that the team is preparing systematically, the other students prepare on their own so that all are well informed when they enter the seminar room. In addition each student fills out a seminar research form in advance of the session; ideas and questions for clarification are recorded on the form (a second page is used to document the sources or record the factual basis of the ideas and questions). The ideas and questions help the instructor and the team substantially in planning the discussion. In these various ways students acquire basic information for themselves, learn how to appraise the sources of information they consult, and are enable to make worthwhile contributions to seminar discussion, on occasion also to knowledge. Some of the contributions to knowledge will be issued as part of the School's publishing programme.

Completely graduate methodology and content are so important to the School that is worth recapitualting some of the features of its system so they can be realized to the fullest possible extent:

1. There are no lectures; seminar discussions take their place. As a consequence students are expected to be active in the seminar room; each individual contributes to the discussion.

2. Audio-visual presentation in the seminars is limited to clarification of ideas, issues, or problems. Presentation of facts and basic information takes place outside the seminar. Thus, students are expected to use fully the School's audio-visual facilities in seminar preparation.

3. The School has no reading lists, no syllabi; it hands out no specially prepared information. Students learn the art of finding information for themselves. Courses are defined by means of objectives and by carefully constructed assignments published weekly in the School's Bulletin.

4. As a consequence of the emphasis on bibliographical resourcefulness, and upon controlled laboratory investigation, all students should develop a research point of view and are expected to follow scholarly habits in all aspects. In return they expect to be treated by the faculty as young scholars.

5. The emphasis in all studies is on principles, on mastery of the subject. Students are expected to develop depth of understanding, a philosophical point of view, at the same time that skills and a knowledge of techniques are acquired.

6. As much of the work as possible is undertaken from primary sources, AV as well as conventional.

7. When secondary sources are consulted they are approached with an understanding of how they can be evaluated by comparison with primary sources, by use of the scholar's critical apparatus of reviews, and by special school of thought.

8. As young scholars, students are expected to read current contributions to knowledge in their field, and to discuss them in and out of seminars.

9. Students are encouraged to make contributions both to seminars and to knowledge on the basis of their subject speciality or national background.

10. Measurement of performance is not by examinations but by means of written and spoken contributions in seminar sessions.

Example of changes

THE UNIVERSITY OF WESTERN ONTARIO - SCHOOL OF LIBRARY AND INFORMATION SCIENCE

1968/1969

1972/1973

The School has three programmes, two of them in being and one about to be introduced: (1) the prerequisite year, (2) the MLS programme, (3) the Ph.D. programme

PRE-REQUISITE YEAR

At least three of the four half-courses in the School's pre-requisite year that are taken within the School must be selected from the "Foundation Studies" group. One other may be selected from electives in the MLS programme. No more than two half-courses may be taken in any one term of the pre-requisite year.

500-509 FOUNDATION STUDIES

501 - Old World Intellectual and Cultural Foundations
502 - New World Intellectual and Cultural Foundations
503 - Book collecting and Librarianship
504 - Intellectual and Cultural Foundations of Classification
505 - Bibliography and Librarianship
507 - Systems Analysis and Libraries
508 - Guided Reading
509 - Education for Librarianship

M.L.S. COURSE OF STUDY

500 - Master's Seminar

501 - Old Word Intellectual and Cultural Foundations
502 - New World Intellectual and Cultural Foundations
510 - Professional Theory and Methodology
511 - The Humanities
512 - The Social Sciences
513 - Science and Technology
520 - Administrative Theory and Practice
524 - School Theory and Practice
530 - Research Principles
531 - Research in the Humanities
534 - Research in the Social Sciences
540 - Periodical Literature
543 - Historical Development of Children's Literature
547 - History of Science
551 - Linguistic and Communication Studies
552 - Problems in the Computer Control of Knowledge
553 - Communication Studies

M.L.S. PROGRAMME

510-519 PROFESSIONAL THEORY AND METHODOLOGY

511 - Humanities
512 - Social Sciences
513 - Science and Technology
514 - Special Topics Humanities
515 - Special Topics Social Sciences
516 - Special Topics in Science and Technology
519 - Problems in the Organization of Information

520-529 ADMINISTRATIVE THEORY AND PRACTICE

520 - Administrative Theory and Practice
521 - Principles of Administration
522 - Library Planning
523 - Library Theory and Practice
524 - School Theory and Practice
525 - Services to Children and Young Adults
527 - Community Services: Local, Regional National
528 - Higher Education
529 - Special Libraries

530-539 RESEARCH PRINCIPLES AND PRACTICE

530 - Research Principles and Practice
531 - Research Principles and Practice in the Humanities
532 - Special Research Topics in the Humanities
534 - Research Principles and Practice in the Social Sciences
537 - Research Principles and Practice in Science and Technology
539 - Guided Research

540-547 SPECIAL TOPICS

540 - Special Topics in Librarianship
541 - Comparative Librarianship
542 - Periodical Literature
543 - Historical Development of Children's Literature
544 - Slavic Libraries and Librarianship
545 - Canadiana
547 - History of Science

550-559 INFORMATION AND COMMUNICATION STUDIES

551 - Linguistic and Communication studies
552 - Introduction to Information Science
553 - Problems in the Computer Control of Information

556 - Introduction to Information, Communication and Coding
557 - Mathematical Models in Library and Information Science
558 - Special Topics in the Computer Control of Information
559 - Audio-visual Theory and Practice

560-569 SPECIAL SERVICES

560 - Special Services
561 - Art Libraries and Information
562 - Business Libraries and Information
566 - Law Libraries and Information
567 - Medical Libraries and Information
569 - Music Libraries and Information

570-579 COGNATE STUDIES

571 - Archives Theory and Practice

580 MASTERS SEMINAR

580 - Masters Seminar

Example of changes

MCGILL UNIVERSITY - GRADUATE SCHOOL OF LIBRARY SCIENCE - MONTREAL

1968/1969

DESCRIPTION OF COURSES

a and b refer to first and second terms respectively.

FIRST YEAR - TOTAL HOURS 32

601a - History of Libraries 2 hours
602b - Introduction to Librarianship 3 hours
603a - Communication Media and the Library 4 hours
604b - Selection and Use of Books and Related Materials 3 hours
605a - Reference Materials and Methods 4 hours
606b - Reference Materials and Methods 4 hours
607a - Cataloguing and Classification 4 hours
608b - Cataloguing and Classification 4 hours
609b - Technical Processes 3 hours

Colloquium - 1 hour

1972/1973

COURSES OF INSTRUCTION

A refers to first term, B to second.

FIRST YEAR - TOTAL HOURS 30

Required Courses

405-602A - Introduction to Librarianship 1 hour
405-603A - Selection and Use of Books and Related Materials 3 hours
405-604B - Idem - 3 hours
405-605A - Reference Materials and Methods 3 hours
405-606B - Idem - 3 hours
405-607A - Organization of Materials 3 hours
405-608B - Idem - 3 hours
405-609A - Administration of Library Operations 3 hours
405-610B - Introduction to Data Processing 2 hours
405-611B - Research Methods 1 hour
COLLOQUIUM

Elective Courses

One of the courses starred below is to be elected by M.L.S.I. students.

405-634B - Problems and Developments in Cataloguing and Classification
405-635B - Advanced Bibliography and Reference Methods
405-637B - Scientific and Technical Literature
405-639A - Special Libraries
*405-640B - College and University Libraries
405-641B - Seminar in Public Library Problems
405-642A - Library Materials and Service for Children
405-644B - Rare Books
405-643B - Library Materials and Service for Young Adults
405-645A - Archives and Records in Libraries
405-646 - A Research Project
405-647 - Independent Study
405-648A - Critical Analysis of Library Studies
405-649B - Library Planning and Architecture
*405-650B - Service to Children in School and Public Libraries
405-651A - Reference Service in the Humanities and Social Sciences
405-652B - Communication Media and the Library

SECOND YEAR - TOTAL HOURS 24

Required Courses - 9 hours

620a - Administration 3 hours
621b - Library Planning and Equipment 2 hours
622a - Research Methods 3 hours
623b - Research Paper 1 hour

Elective Courses - 15 hours

5 courses Must be taken. Each Course 3 Hours. Not all Courses are Available in Any One Year.

630b - Library Collections: Assessment and Development
631a - Data Processing and Equipment
632b - Library Applications of Data Processing
633a - Problems and Developments in Cataloguing and Classification

SECOND YEAR - TOTAL CREDIT HOURS 24

Required Courses (3 hours)

405-620A - Theory and Principles of Administration 3 hours
405-622 - Research Paper

Elective Courses (21 hours)

7 courses must be taken. Each course 3 credit hours. Not all courses are available in any one year.

*405-612B - History of Books and Printing
*405-613B - Audio-visual Materials
*405-614B - Public Library, Organization and Development
405-630B - Library Collections: Assessment and Development
405-631B - Systems Analysis

634b - Idem
635a - Advanced Bibliography and Reference Methods
636b - Government Publications
637b - Scientific and Technical Literature
638b - Business Literature
639a - Special Libraries
640b - College and University Libraries

405-632A - Library Applications of Data Processing I
405-633B - Idem II (Information Retrieval)

COURSES IN ANOTHER SCHOOL OR FACULTY

A maximum of 12 hours (i.e. four half-courses) may be taken with permission provided students have the necessary prerequisites. The following are among the courses suggested:

Operations Research
Mathematical Logic
Introduction to Deductive Logic
Public Administration
French Canadian Politics
Selected Topics in the Modern History of French Canada
Introduction to Historical Geography
Social Psychology
Modern Psychology in Historical Perspective
Industrial and Counselling Psychology
Sociology of the Professions
Urban Sociology
Social Change
Introduction to Statistics
Methodology and Philosophy of Science
History of Educational Thought
Russian Language
Literature and Science
Literature and Society
The Film
Studies in Communications
Canadian Literature

Examples of trends

UNIVERSITY OF TEXAS - GRADUATE SCHOOL OF LIBRARY SCIENCE

"A special program in Latin American Library Studies was inaugurated in 1964 - made possible by a Ford Foundation grant and the co-operation of the University's Latin American Institute, and designed to meet the needs of librarians and bibliographers wishing to combine library work with Latin American scholarship. Depending on the previous study, experience, and objectives of students, this program may lead either to the master's degree in library science, or in Latin American Studies. The student without previous study in library science will normally study for the Master of Library Science Degree, while the holder of a fifth-year degree in library science from an ALA accredited school may elect to study for the Ph.D. Degree. In addition to meeting Graduate School admission requirements, the applicant for admission to this program must have proficiency in spoken Spanish and a reading knowledge of Portuguese."

Latin American Library Studies

May be repeated for credit when the topics vary. (Graduate standing; proficiency in Spanish and Portuguese, consent of the graduate adviser).

Topic 1: Latin American Materials: Colonial Period
Topic 2: Latin American Materials: National Period
Topic 3: Latin American Archives
Topic 4: Latin American Publishing and Book Trade
Topic 5: Library Development in Latin America
Topic 6: Seminar in Latin American Library Studies.

Example of a wide-scope integrated programme

UNIVERSITY OF PITTSBURGH

INTERDISCIPLINARY DOCTORAL PROGRAMME IN INFORMATION SCIENCE (1971 - 1972)

Description of Programme:

The basic tenet of the programme is that there is a requirement for the study of the phenomena of information as a science. Such a science should develop by the careful identification of related theories, laws, and concepts; and from such theories, laws, and concepts, generate and conduct experiments which explicate the phenomena of information. As such, the educational objective of the programme is the training of individuals in scholarly attributes which can contribute to the development of such a science.

Despite the obvious importance of the role of man in the information process, most academic programmes in this area have predominantly stressed the technological or engineering component of the process. There is a need, therefore, for a training programme which balances the human aspects of the information phenomena with the technological. The theories, principles, and laws governing human function need to be studies along with the details of the technology directly related to man's use of information. Consequently, individuals with broad backgrounds are needed to assemble, relate, and integrate areas of knowledge and to test their relevance to information phenomena both in practical and theoretical contexts.

The ability to work in interdisciplinary teams as well as independently; the ability to understand the manner of thinking and approach to technical and scientific problems characteristic of the various fields and disciplines; the ability to know the state of the relevant technology and how it can be applied to human information problems and to know man's limitations in application and use of technology is at the core of the academic programme for Interdisciplinary Doctoral Studies in Information Science at the University of Pittsburgh.

Information Science Courses:

Foundations of Informatology I (An overview is presented of the basic concepts from which a science of information may be developed. Areas studies include data acquisition, transmission, processing, and data presentation).
Foundations of Informatology II (Continuation of I. Areas studied include data and information utilization. Principles underlying information transfer (communications) are introduced and discussed. Particular stress is placed on human cognitive theory in the development of a science of information).
Mathematics in Information Science
Statistics in Information Science I and II

Sociology of Information Science
Philosophy of Information Science
Computer and Research Design
Theories of Classification and Indexing
Communication Theory
Linguistics and the Library and Information Sciences
Languages for the Library and Information Sciences
Cybernetics and Information Science
Syntax and Semantics of Information Retrieval
Independent Study (Allows individuals interested in the basis science area of information science to read intensively on the subject with the general guidance of an advisor).
Foundations of Behavioral Theory I (Provides the student with an understanding of the principles, theories, and methods used in the study of human behavior. Intended for students whose under-graduate major was in the physics or engineering sciences)
Foundations of Behavioral Theory II
Human Information Processing
Human Communication
Computer Applications of Behavioral Science
Human Factors in Systems
Independent Study (Allows individuals interested in the behavioral science area of information science to reade intensively on the subject with the guidance of and advisor)
Computers and Logic in Information Retrieval
Data Processing and the Library. (The basic elements of a computer system are covered. Flowcharting and the FORTRAN programming language are learned. The elements necessary for library automation are discussed in the context of designing a portion of an automated library system)
Advanced Data Processing and the Library. (This course is an extension of the preceding one and covers the following areas: data management; vocabulary control techniques; search and retrieval techniques; and systems design. Students are introduced to the fundamental element of assembly and COBOL languages).
Artificial Intelligence
Pattern Recognition (IS and CS course)
Information Structures (IS and CS course)
Information Handling Systems (IS and CS course)
Computer-Assisted Instruction
Interactive Systems
Man-Machine Communication
Independent Study. (Allows individuals interested in the computer science area of information science to read intensively on the subject with the general guidance of an advisor)
Mechanized Information Retrieval
Information Presentation
Informatics I and II. (This course deals with the engineering principles underlying the design and development of information systems. Elementary physics for electronics, light, and sound are reviewed. Equipment useful in implementing information systems is studied. Included are computer input devices: printers, mechanical plotters, computer output microfilm, and microfilm equipment. Developing technologies which may have an impact on future information systems are discussed)
Systems Management (IS and IE course)
Systems Reliability and Maintainability Engineering (IS and IE course)
Specialized Information Centres
Community Analysis and Development
Operations Research (IS and IE course)

Independent Study. (Allows individuals interested in the technology area of information science to read intensively on the subject with the general guidance of an advisor)
Colloquium
Practicum
Independent Study. (Allows individuals interested in the technology area of information science to read intensively on the subject with the general guidance of an advisor)
Thesis
Research Seminar. (Students will participate in research activities in the basic science area of information science)
Independent Study in the Basic Science Area
Research Seminar. (Students will participate in research activities in the behavioral science area of information science)
Independent Study in the Behavioral Science Area
Research Seminar. (Students will participate in research activities in the computer science area of information science)
Independent Study in the Computer Science Area
Research Seminar. (Students will participate in research activities in the systems and technology area of information science)
Independent Study in the Technology Area
Colloquium
Practicum
Independent Study. (Allows individuals interested in specific areas of information science to read intensively on the subject with the general guidance of an advisor)
Dissertation

no changes 1972-1973